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ABSTRACT

Examining a sample of 17 sixth, seventh, and eighth grade language arts and social studies teachers in the Eugene (Oregon) area, this study sought to determine the effects of inservice coaching on teachers' transfer of newly learned classroom strategies into their instructional repertoires, and to identify the problems in transferring skills. All teachers were trained in three models of teaching--Bruner's Concept Attainment, Taba's Inductive Thinking, and Gordon's Synectics. As an aid in applying the strategies in the classroom, nine teachers received coaching for 6 weeks--including repeated observations and technical feedback; eight were observed but uncoached. Scales for model-relevant teaching behaviors were derived from the Teacher Innovator System observation instrument, with multiple regression used to determine the contribution of coaching to the teachers' transfer of training. Results indicated that coaching was effective in helping teachers include a conceptual level as well as factual level of information processing in the classroom and also in maintaining the models as optional instructional strategies. It was found that among the most serious problems for teachers in transferring training were making instructional objectives suitable to the new models, approaching curricula as sets of concepts rather than as activities, and finding time and encouragement in a school setting to master new strategies. Appendixes include a review of literature on transfer of training and the instruments used in the author's study. (JW)

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EA 015 695

# TRANSFER OF TRAINING:
# THE CONTRIBUTION OF COACHING

by

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# ABSTRACT

This study addressed the problem of teachers' transfer of newly learned instructional skills to classroom practice. A training component called "coaching" was developed to determine if intensive collaborative planning with and support for teachers following initial skills training would facilitate the transfer of complex models of teaching into their active teaching repertoires.

Seventeen sixth, seventh, and eighth grade language arts and social studies teachers were trained in three models of teaching. Following initial training, half of the teachers (n = 9) were randomly assigned to a coaching treatment for an additional six weeks, while the remaining teachers (n = 8) were observed but not coached. In May/June all teachers taught a one-week experimental unit over which their students were tested for recall of factual material as well as integration and synthesis of the content.

Results strongly supported the power of coaching for facilitating teacher transfer of training. Factors inhibiting transfer of training included difficulties understanding the fit of new strategies with existing curricular objectives and materials, time required to master new skills, discrepancies between expected and obtained student responses to the new strategies, and lack of supporting structures within the schools in which teachers worked. Contrary to expectations, students of high transfer teachers scored better on recall tests but no differently on essay tests than students of low transfer teachers.

Results of the present study suggest that when the object of training is the transfer of new knowledge and skills to classroom practice, training should be more extensive than has typically been the case.

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## FINAL REPORT

### Transfer of Training: The Contribution of Coaching

Given the resources expended annually on staff development activities, educational policy makers are justifiably concerned with the returns they might expect on their investment. Whether decisions affect federal expenditures on teacher centers and research and development activities or state and district expenditures on curriculum development and personnel training, decision-makers need a sound basis for wisely disbursing funds intended ultimately to improve student learning.

An earlier review of research on teacher training (Joyce and Showers 1981) suggested that many staff development activities are based on the unproven assumption that training will result in changes in teacher behavior and eventually yield concomitant changes in student behavior. Joyce and Showers argued that this assumption was unwarranted, not because teachers are inadequate learners but rather because training has been unrealistically skimpy. Research on teacher training suggests that fully elaborated training systems, including theory study, demonstrations of a model or strategy to be learned, and practice and feedback in relatively protected conditions (such as microteaching or peer teaching), are sufficient for skill development. Our concern, however, is for transfer of training. For most of us, the attainment of skill is not a sufficient condition to bring about transfer of that skill into the workplace. Once a teaching skill has been attained, it needs to be transformed during the process when it is transferred into the active repertoire. The conditions of the classroom are sufficiently different from training situations that one cannot simply walk from the training setting into the classroom with the skill completely ready for use--it has to changed to fit classroom conditions.

The research on teacher training appears to divide between those studies that focus on the "tuning" of already existent or latent skills and the mastery of patterns of teaching (teaching strategies or models of teaching) which require a major addition to the existing repertoire of the teacher. "Tuning" skills polishes and enhances the existing repertoire of the trainee by sharpening the ability to ask questions, to praise and reinforce, to increase the involvement of students, and increase time on task, whereas the mastery of a teaching approach which is not in the "naturally developed" repertoire of the teacher requires the trainee to think differently, organize instruction in fresh ways, and to help children adapt to new approaches to teaching. There appears to be more knowledge about how to help teachers "tune" their existing repertoire than there is about how to help them make major additions to it (see review of research in Appendix A).

### Transfer of Learning

In the traditional literature from psychology, transfer usually refers to "the influence of prior learning upon later learning" (Klausmeier and Davis 1969) and the distinction is made between lateral and vertical transfer. Transfer is lateral when a person generalizes learning to a new task of the same complexity. An example in teaching occurs when a science teacher, having learned to use advance organizers to structure lectures and readings in chemistry, applies the same techniques to structure lectures and readings in physics. Vertical, or cumulative transfer is the condition in which "knowledge and abilities acquired in performing one task facilitates the learning of higher-order tasks" (Klausmeier and Davis 1969, p. 1483). An example in teaching occurs when a science teacher who has taken a chemistry course using inductive laboratory exercises, organizes and teaches a course built around inductive laboratory experiences. The skills learned as a student are elevated to the teaching function--a more complex application requiring judgment and management not required in the student role. Essentially transfer can be positive or negative, depending on whether prior learning facilitates or retards later learning, or there can be zero transfer, as when prior learning has no effect on later learning. A primary goal of teachers and teacher educators is positive, cumulative transfer of learning as teaching skills learned in the training setting are applied in the school.

The study of transfer typically has followed a research paradigm in which an experimental group receives training and both the experimental and control group are then tested on a transfer task that is dissimilar in some way to the training task. Posttests for transfer generally follow training by several weeks or months. In contrast, studies of training, which also frequently employ a treatment and control group, seldom check for skill fidelity in applied settings following training. (There are exceptions, of course, e.g., Johnson and Sloat 1980; Moore and Schaut 1979; Perkins and Atkinson 1973.)

The positive, cumulative transfer of learned teaching skills and strategies to classroom practice is enormously complex. Newly acquired skills must be integrated into an existing repertoire of skills and knowledge. Curriculums must be reexamined for appropriate uses of new skills, and goals must be reviewed in relation to new strategies. Thus, learning to perform a new skill or strategy is only the first step toward affecting student outcomes. Transfer of training to the learning environment requires skillful decision making by the classroom teacher and redirection of behavior until the new skill is operating comfortably within the flow of activities in the classroom.

## Coaching

Analysis of the training literature and the problem of transfer of training has underscored the need for expanded training, a process we have called "coaching." Although specific studies have done little to develop and test a coaching technology, the concept is grounded in the work of several researchers. The present study drew on their work as coaching procedures were developed.

McKibbin and Joyce (1981), in their study of teacher personality dimensions and ability to acquire and use various models of teaching, provided long-term consultant services to teachers in training. Although "coaching" was not employed systematically, the procedures they developed provided a useful heuristic for the development of a coaching technique. Good and Brophy (1974) demonstrated the power of intensive observations and feedback for assisting teachers to alter their attending behaviors. Borg and his associates (1969a, b) have provided a demonstration of self-coaching capability in the development of the minicourses, and their training facilitated horizontal transfer of training to an exceptional degree. Stallings, Needles, and Stayrook (1978) and Dornbusch, Deal, and Plumley (1974) have designed collegial systems for training and evaluation. The system most similar to that used in this study was employed by Sharan and Hertz-Lazarowitz (1982). These investigators provided extensive initial training (52 hours) to teachers learning a new teaching strategy (small group teaching) and followed the initial training with consultant-assisted self-help teams composed of three or four teachers. The teams engaged in cooperative planning of teaching process and content, mutual observation of teaching, and feedback by teammates to the teacher being observed. Sixty-five percent of the regular classroom teachers who took part in the project were observed to implement small group teaching on a fairly high level.

Coaching occurs at the point where the trainee attempts to implement the new teaching strategy in the classroom. Coaches may be peers, supervisors, principals, college instructors, or others, who are competent themselves in the utilization of the new approach to teaching. That is, they have achieved vertical transfer themselves or are in the process of achieving it. In the classroom they coach the teacher as he/she takes the first halting steps toward the utilization of the model, help him/her figure out how to teach the students how to respond to it and to adapt it to match their characteristics, and provide support as the teacher takes the first steps toward the utilization of the new model. This latter aspect is probably extremely important. It is highly probable that people behave much less efficiently during the first trials with any new model and that their students behave much less appropriately as well. In other words, in a certain sense, quality of performance diminishes during the period of transition from skill acquisition to complete vertical transfer (the state somewhat akin to levels five and six in Gene Hall's hierarchy [1977]). Because of this sense of decreased efficiency, the teacher feels like his/her performance has actually gone downward during the crucial stages in which he/she is first attempting to use a new model in the classroom.

Coaching, then, may be conceived as a combination of several elements: the provision of companionship, the giving of technical feedback, and the analysis of application.

The first function of coaching is to provide support and encouragement to another person during a difficult process. The coaching relationship results in the possibility of mutual reflection, the checking of perceptions, the sharing of frustrations and successes. Companionship provides reassurance that problems are normal. The often lonely business of teaching has sorely lacked the companionship that is possible in coaching teams.

Technical feedback should not be confused with general evaluation. Feedback implies no judgment about the overall quality of teaching but is confined to information about the execution of relevant skills or strategies. Coaches pick out omissions, examine how materials are arranged, and check to see whether all the parts of the teaching strategy have been brought together. Technical feedback helps ensure that growth continues through practice in the classroom.

One of the most important learnings during the transfer period is figuring out when to use a new method/skill/strategy appropriately and what will be achieved as a consequence. Selecting the occasions for the use of a teaching strategy is not as easy as it sounds; nearly everyone needs assistance in learning to pick the right spots for exercising it. The coaching context provides an opportunity for examining goals, curriculum, and materials, and thinking about appropriate use of a newly acquired skill or behavior.

Evidence is building (Berman and McLaughlin 1975; Fullan and Pomfret 1977; Griffin 1982) that for the implementation of new curriculums and teaching strategies that require substantively new ways of thinking and behaving, much more extensive training than is generally provided is required if the new behaviors are to be implemented in classrooms. Current practice often dictates the allocation of inservice funds across a broad range of topics and activities. Present work in the area of staff development would suggest a concentration of resources when the objective is to transfer new knowledge and skill into classroom practice. When, on the other hand, the goal of an activity is to create awareness of an area, a single workshop or presentation might be the most appropriate activity.

The literature on skills training, transfer of training, and implementation strategies suggests ways to attack the problem of transfer and address policy questions with regard to inservice programs. First, it is fairly clear that with the best current training procedures, teachers can acquire new knowledge and skills, although they are unlikely to transfer this learning to classroom practice. Second, the record of curriculum implementation suggests that massive marshalling of resources without inservice programs is unlikely to accomplish change. Finally, transfer of training probably represents a different training problem for which different inservice programs must be developed. Apparently transfer of training requires more than good skills training and the application of massive resources.

## Research Questions

In the present study, three major questions were addressed. First, the study devised a coaching treatment and attempted to determine the effectiveness of that treatment in facilitating transfer of new teaching strategies to classroom practice. Second, the process of transfer of training was studied to discover what problems were encountered as teachers attempted to integrate new teaching behavior into their instructional repertoires. Finally, the degree of teacher transfer of training was examined in relation to student learning on an experimental unit taught by all teachers.

## DESIGN

The present research employed an experimental pretest/posttest control group design to examine relationships among training components, treatment conditions, teacher transfer of training, and student outcomes. The teacher sample was drawn from junior high and middle schools in the greater Eugene (Oregon) area and the student sample consisted of intact classes (one per teacher) of the teachers participating in the study. Research questions were addressed by analyzing data collected from observations, paper and pencil tests, teacher plans, and interviews.

## Sample

Recruitment procedures. In December 1981 and January 1982, school districts were petitioned for permission to recruit teachers for the current study. Seventh and eighth grade language arts teachers were approached initially. When insufficient numbers of subjects volunteered, all sixth, seventh and eighth grade language arts and social studies teachers in the two districts were invited to participate (see letters and records of visits in Appendix B to document recruitment procedures). Selection criteria for all teachers included: three or more years teaching experience, current teaching assignment at the sixth, seventh or eighth grade level in language arts or social studies, willingness to be randomly assigned to treatment groups after an initial training, and willingness to teach an experimental, one-week unit to one class of students in the spring of 1982. Incentives for teacher participation included modest honoraria for time spent in project-related activities and three units of university credit for participation in the initial training.

The student sample consisted of one class for each teacher participant. Although teachers at the junior high level typically teach five classes a day, only one class for each teacher could be adequately monitored.

The junior high school level was chosen for study for several reasons. First, the departmentalized structure and teacher preparation periods should facilitate the eventual implementation of a peer coaching program. Second, the student outcome measures of interest in this study (e.g., advanced reading/thinking skills) were more appropriate to secondary students than to elementary students. Students reading in content areas (English, social studies, science, etc.) are expected not only to recall relevant facts and information but to operate on that information to solve problems, generalize, and reach conclusions by integrating new information with previously acquired knowledge and concepts.

Characteristics of teacher sample. A total of 25 teachers volunteered to participate in the study and signed the informed consent form, although 8 teachers subsequently dropped out. The final sample was composed of 17 sixth, seventh and eighth grade language arts and social studies teachers. The 6 male and 11 female teachers had teaching experience ranging from 4 to 33 years (mean = 10.64 years). Eight of the teachers held a Bachelor of Arts or Science degrees and nine held masters degrees (MA or MEd). Three of the teachers taught sixth grade (all subjects) in elementary schools, nine teachers taught sixth, seventh or eighth grades in middle schools (multiple subjects) and five taught seventh or eighth grades in junior high schools. Table 1 summarizes the demographic characteristics of the teacher sample.

## Data Collection

Baseline data were collected on all teachers during the first three weeks of training, using the TIS (Teacher Innovator System) observation instrument. TIS forms were slightly modified to allow keypunchers to enter

TABLE 1
Demographic Characteristics of Teacher Sample

| | | |
|---|---|---|
| School Type | Elem (6th) | 3 |
| | Middle School (6th-8th) | 9 |
| | Junior High (7th-9th) | 5 |
| | | 17 |
| Degree Level | BA/BS | 8 |
| | MA/MS | 7 |
| | MA/MS+ | 2 |
| | | 17 |
| Grade Level Taught | 6th | 3 |
| | 7th | 6 |
| | 8th | 3 |
| | Multiple Grades | 5 |
| | | 17 |
| Subject(s) Observed | Language Arts | 10 |
| | Social Studies | 7 |
| | | 17 |
| Years Teaching Experience | 1-5 years | 5 |
| | 6-10 years | 5 |
| | 11-15 years | 3 |
| | 16 or more years | 4 |
| | | 17 |
| | [$\bar{X}$ = 10.69; S.D. = 7.13] | |
| | Range = 4 to 25 | |

data directly from the observation forms (see copy in Appendix C). Between March 1 and March 17, all teachers were again observed in their classrooms three times, once for each model studied. These observations served as a skill level check to ensure that all teachers had reached a minimum level of skill before proceeding to Phase II of the project (coaching).

At the completion of the initial training for all teachers and prior to the coaching treatment, all teachers were interviewed and students were tested on a measure of verbal ability. The purpose of the teacher interview (see "Initial Interview," Appendix C) was to learn teachers' perceptions of what they teach and how they teach it, and their estimates of their current and probable future use of the models studied in the initial training. The verbal measure administered to students (see Appendix C) was used as a covariate in determining student scores on the final unit taught by all teachers.

The Conceptual Level (CL) test was administered February 10 to all project teachers and sent to the Ontario Institute for Studies in Education for scoring. CL scores were returned to us March 15. (A copy of the CL test appears in Appendix C.)

Nine of the 17 teachers who completed the initial training were selected for the coaching treatment. Pairs of teachers were ranked from high to low on the basis of their Conceptual Level scores, and one of each pair was randomly selected for the coaching treatment. The remaining eight teachers served as a control group and were observed during the period the treatment teachers were coached.

During the coaching phase, four coaching observation/conferences were conducted for each treatment teacher. Each coaching conference was conducted by the principal investigator and observed/recorded by one of the project research assistants. After the first two coaching conferences, the nine treatment teachers met to discuss successful and unsuccessful trials with the new teaching strategies in their curriculum areas and to share lesson ideas.

Control teachers were observed three times during the coaching treatment period. These teachers were told that we would be interested in seeing them practice the models of teaching we had taught them during the initial training but that they were not obligated to do so.

In May 1982 all teachers participating in the project taught a unit from materials we provided. Teachers were allowed four days to teach the material and on the fifth day, project staff tested students and interviewed teachers (see "Exit Interview," Appendix C).

## Instruments

Paragraph Completion Method (PCM). Conceptual level (CL) was measured by the PCM developed by Hunt and his colleagues at the Ontario Institute for Studies in Education (1978). The measure consists of six stems (e.g., "When I am criticized...," etc.) to which the subject responds in three or four sentences. Each response is rated on a four-point scale and the mean for the three highest scores becomes the CL score. The responses were scored at OISE by reliable raters.

*Clinical assessment.* The Teaching Analysis Guides developed by Joyce and Weil (1978) were used to provide feedback to teachers during the initial training phase. The guides are rating forms on which fidelity to the parts of a strategy is recorded. Gower (1974) compared ratings of 30 student teachers on the Clinical Assessment Forms with TIS. While providing much less detailed information than TIS, the forms nevertheless consistently identified discrepancies between the teachers' performance and the ideal toward which they were aiming, and the discrepancies closely paralleled those recorded with TIS. (Examples of the Teaching Analysis Guides appear in Appendix C.)

*Teacher Innovator System* (TIS). The full title of this instrument is the Teacher's College Skills and Strategies Interaction Analysis System. A modification of the Joyce "Conceptual Systems Instrument," the current system was developed by Marsha Weil, Chris Guillon and Diane Cole. TIS classifies teacher behavior on three dimensions--structuring, information processing, and feedback. Teacher behavior during a lesson is coded continuously rather than sampled.

Observers can be trained in approximately 30 hours to use the instrument reliably. Inter-rater agreement is computed on specific communications from typescripts of lessons (percentage of exact agreement) and by correlating the indicies computed from two or more observations of the same lesson. Technical data on TIS may be found in McKibbin's (1974) comparison of TIS with the Flanders and Bellack interaction analysis systems.

The Teacher Innovator System (TIS) collects information on 19 dimensions of teacher/student behavior. Eight categories are subsumed under "structuring" behavior, five under "Information Processing" and six under "Feedback." For each of the 19 categories, 4 possibilities exist at any point in the coding--teacher statements or questions and student statements or questions. Various indices may be computed for any lesson coded with TIS, e.g., total teacher statements or questions, total student statements or questions, total teacher and student communication at the factual, conceptual or theoretical level of information processing, etc. In addition, proportions may be computed, e.g., proportion of teacher statements in structuring to total teacher statements or proportion of teacher talk to student talk.

Because TIS data are collected continuously during a lesson and lessons varied in length, frequencies for each category and/or index were divided by time to yield a density factor for each behavior which could then be compared across teachers. Observers rarely code behavior at exactly the same rate, so total frequencies for any category are seldom the same for any two observers.

To determine inter-observer reliability on TIS, Cronbach's Alpha was computed for the 12 observations in which 2 observers recorded the same lesson. Although correlations were computed for all individual items, only scales were included in the computation of Alpha reliability coefficients. Table 2 includes reliability coefficients for all scales used in the analysis of TIS data.

TABLE 2
Reliability Coefficients for TIS

| Scale | Cronbach's Alpha |
|---|---|
| Teacher Structuring | .80 |
| Teacher/Student Factual Info Pro | .94 |
| Teacher/Student Con Info Pro | .83 |
| Teacher/Student Theo Info Pro | .33 |
| Total Tea Stmts - Info Pro | .87 |
| Total Stu Stmts - Info Pro | .80 |
| Total Stu Quest - Info Pro | .98 |
| Total Tea/Stu Feedback | .83 |

As can be seen in Table 2, adequate reliability was maintained on all scales with the exception of Teacher and Student Theoretical Information Processing. The relative infrequency of communications at this level made maintenance of reliability more difficult.

Student outcomes. A measure of verbal ability was given to students in January and three instruments were administered to students following the teaching of the unit of instruction. The V-3 Wide Range Vocabulary Test is a 5-choice synonym test suitable for grades 7-16 and having items ranging from very easy to very difficult. The test has a total of 48 items (24 items in each of 2 parts) and 6 minutes is allowed for each part (Appendix C). The test is published by Educational Testing Service (1963); relevant technical information is provided in the Manual for Kit of Reference Tests for Cognitive Factors (French, Ekstrom, and Price 1973).

A 35-item multiple-choice recall test was administered to measure student recall of facts, principles, and ideas. This test consists of items having four alternative answers and developed by Stanford graduate students in educational psychology specifically for the text materials from which the students were taught.

To measure student cognitive achievement of higher order processes, an essay test was administered to each student. The essay test required each student to draft a letter to a hypothetical friend describing what it would be like to live in the town that was the subject of the teaching sessions. The essay test was scored by the degree to which students compared and contrasted cultural mores, synthesized factual data to generalize about the people and the cultural studied, and evaluated advantages and disadvantages of living in the culture.

To measure the effects of teaching in the affective domain, an attitude inventory was administered to each student. The attitude inventory consisted of ten statements of opinion about the subject matter taught, the teacher, and the students' performance in class. For each of these items, each student indicated the extent to which he or she agreed or disagreed with the opinion statement using a five-point Likert scale ranging from "strongly agree" to "strongly disagree." Previous use and development of these instruments is reported in Joyce, Brown, and Peck (1981). (Copies of the tests appear in Appendix C.)

## Procedures

### Phase I - Sample Selection and Initial Testing

In December 1981 and January 1982, 25 sixth, seventh, and eighth grade language arts and social studies teachers were recruited for the study. Baseline data (TIS) were collected for all teachers during the first three weeks of training (late January, early February) and CL tests were administered to teachers.

A test of teacher Conceptual Level (CL) was chosen as a cognitive measure for blocking. CL is theorized to range from concrete, rigid thought and behavior to abstract thought in which individuals can recognize the complexities of interrelationships. Miller (1981), in a review of research within the Conceptual System Theory framework, reported that "teachers of different CL have been shown to differ in the level of empathy displayed...." and "the flexibility and adaptability of teaching style has been found to be positively related to CL." Miller concluded that there is "reasonable support for the contention that teacher CL is related to consistent differences in teaching style" (p. 70).

In the present study, high CL was hypothesized to be positively related to acquisition of repertoire and transfer of skills to a complex instructional environment.

### Phase II - Skills Training

Initial skills training in three models of teaching began January 27, 1982 and ended March 10, 1982. The training sessions met once a week, three hours per session, for seven weeks.

Description of skill training. In session one, teachers were introduced to the Concept Attainment model of teaching (based on Jerome Bruner's work as explicated in Joyce and Weil's Models of Teaching [1980]). Participants received written materials on the strategy, heard a brief lecture, participated in several demonstrations of the model, and observed the feedback procedure with the Clinical Assessment Form.

The second session was devoted to peer teaching by participants, with observation and feedback from the principal investigator (PI) and the two research assistants.

Session 3 followed the format for session 1, with Taba's Inductive Thinking model the subject of demonstrations. Teachers had read the Taba material before seeing demonstrations of this model.

Session 4 and half of session 5 were spent in peer teaching of Taba's Inductive Thinking model. In the last half of session 5, the Synectics model was demonstrated. Participants had read the material from Joyce and Weil's Model of Teaching on synectics.

Session 6 began with a second demonstration of synectics and teachers then peer taught synectics lessons in small groups.

In session 7, all participants brought their logs recording classroom practice of each of the models studied. Problems encountered during practice with models were discussed and successful lessons shared. Future observation and interview procedures were discussed with all participants.

The three models of teaching used in the skill training--Bruner's Concept Attainment, Taba's Inductive Thinking, and Gordon's Synectics--represented a continuum of difficulty for both teachers and students. The Concept Attainment Strategy focuses on categorizing activity--identifying and placing events into classes on the basis of using certain cues and ignoring others. In this model of teaching, the teacher presents data structured to facilitate identification of a concept by students, tests attainment of the concept by providing additional "unlabeled" data, and assists students in analyzing their thinking strategies. In Taba's Inductive Thinking Strategy the teacher, through eliciting questions, moves the students from concept formation to interpretation of data and application of principles. For older students, emphasis is on the latter two activities. Synectics requires analogic thinking by students in a series of teacher-led analogy-producing activities, culminating in applications to both imaginative and critical writing.

At the completion of initial skills training for teachers, one class of students for each teacher was administered a measure of verbal ability and teachers were given the first of two interviews. Teachers were also observed with TIS as they taught each of the three strategies in their classrooms.

### Phase III - Coaching and Transfer Task

Following skills training, nine of the teachers in the initial training group received a coaching treatment designed to boost their level of implementation of the new strategies. The principal investigator met with each teacher five times during this period, four times individually and once with the entire coaching group.

Each individual conference followed observation of a lesson, and all conferences were conducted by the PI. One of the observers "shadowed" the PI, providing TIS data for feedback and documenting the content of the conferences. Conferences focused on planning for appropriate use of new models, teachers' educational objectives for teaching specific subject matter and discussion of strategies best suited to achieving objectives. The PI provided information and support as teachers worked to integrate the trained strategies into their active repertoires.

The group conference focused both on problems encountered as implementation was attempted and on ideas for future use of the new models, and provided an opportunity for teachers to share experiences with the new teaching strategies.

During the coaching period, coached teachers were observed four times and uncoached teachers three times.

In May 1982 both coached and uncoached teachers taught one-week units from identical data banks. Teachers were given materials one week prior to their teaching of the unit to allow time for planning. A letter included with the materials (see Appendix B) informed teachers that they should use the materials to pursue educational objectives they would normally be addressing in their subject areas (e.g., for language arts teachers, vocabulary development, reading comprehension, and writing; for social studies teachers, comparative studies of cultures, etc.), and project staff reiterated the assignment when delivering materials to teachers. Teachers were also notified that their students would be asked their attitudes toward the material and the teaching strategies employed and would complete a recall test over the factual material covered as well as an essay assignment. Finally, all students were provided copies of the material at the beginning of the week in which they were to study it.

The only direction provided teachers with regard to teaching strategies for the unit was that they use whatever strategies they felt would be most appropriate for achieving their instructional aims. Teachers were also told that in the final interview we would discuss with them their reasons for using whatever instructional strategies they had employed during the teaching of the unit.

At the end of the week's instruction, students were administered recall, essay and attitude tests and teachers were interviewed for the second and final time.

## Analysis

Before the researchers addressed the questions asked in this study, TIS data were reduced to a smaller set of variables and scales, tests were scored (CL tests were scored at OISE, student attitude and objective tests were graded by project staff, and essays were scored by the PI, research assistants, and a consultant), and transfer of training scores were computed.

Initially, means, standard deviations, frequency distributions, and correlations were computed for all TIS categories. The data were then reduced to a set of variables and scales used to determine patterns of model-relevant behaviors for the three trained teaching strategies.

The scales derived from TIS data were Structuring (communications regarding the purpose and content of a lesson, procedures to be followed, behavior expected, etc.); Information Processing (student and teacher interactions at three levels of cognitive difficulty, open communication in which cognitive level was not apparent, and valuing or opining); and Feedback (positive, neutral, negative, or corrective communications, repetition of student answers). Individual variables were computed for Factual, Conceptual and Theoretical information processing and consisted of all teacher and student statements and questions at those levels. TIS scales and variables for each teacher were based on data aggregated by teacher for each observation period (Baseline, Skills Training, Treatment, Transfer Task). Teachers' TIS scores were then entered in between-groups comparisons of coached and uncoached teachers' transfer of training scores and student outcomes.

Student essays were scored by counting the number of concrete and abstract themes and extensions of those themes, comparisons between cultures, theme and multiple theme connectors, essay integrations, and hierarchical integrations. The total essay scores weighted abstract themes, comparisons, theme connectors, and integrations more heavily than concrete themes and extensions (see Essay Scoring Form in Appendix C).

Teacher transfer of training scores were a composite of skill and appropriateness of use with the trained models of teaching. Although frequency of practice trials with the models strongly influenced eventual ability to transfer training to the classroom, no factor for practice was included in the transfer scores. Rather, transfer scores were derived from (1) teachers' skill (technical competence) in the use of the models on all observed lessons in which the models were used following initial training and the "on-demand" skills check lessons, (2) ratings of the appropriateness of specific models, given the teachers' curriculum and instructional objectives, and (3) ratings of the teachers' ability to teach the model to the students (e.g., the ease with which students were able to respond to the model, student familiarity with procedures within any given model, etc.). While number one above would seem to favor teachers who were coached, in fact followup interviews revealed that far fewer trials with the models were attempted by uncoached teachers than by coached teachers. Sampling error (number of lessons observed in which models were used) did not appear to bias transfer scores in favor of the coached teachers.

To determine the contribution of the coaching treatment to transfer of training, multiple regression was employed. Records of coaching conferences and teacher interviews were analyzed to discover difficulties teachers encountered as they attempted to use the new models of teaching, and staff perceptions of teacher difficulties were based on personal observations as well. The effects of teacher transfer of training and student verbal ability on student essay and recall scores were examined by means of multiple regression.

## RESULTS

The primary concern of the present study was transfer of training. Concluding from research on training that most of the skills and knowledge gained by teachers in inservice programs are never implemented in the classroom and therefore have no opportunity to influence student learning, the experimenter devised a fully elaborated program, including coaching of teachers in their own classrooms, in an effort to facilitate transfer of training. This study conceived transfer of training as a new stage of learning separate from the mastery of new knowledge and skills. Appropriate use of a skill in its context requires integrated knowledge of students, subject matter, objectives to be achieved, and dimensions of classroom management. To confound things somewhat further, sets of teacher behaviors which surround and make the existing repertoire function well actually may be dysfunctional to new models of teaching.

The primary objective of this study was to determine the effects of a coaching treatment on teachers' ability to transfer newly learned models of teaching into their instructional repertoires. Furthermore, the process of transfer itself was studied in an effort to gain greater understanding of the problems teachers encounter as they attempt to integrate new learning into classroom behavior. Finally, student outcomes on an experimental unit taught by both coached and uncoached teachers were examined in relation to the degree of transfer of training exhibited by their teachers.

## Coaching and Transfer of Training

Transfer of training scores ranged from a low of 2 to a high of 17 ($x = 11.67$; S.D. = 4.21 for coached teachers, $x = 5.75$, S.D. = 4.23 for uncoached teachers). To assess the contribution of the coaching treatment to teachers' eventual transfer of recently trained models of teaching into their instructional repertoires, relationships among teacher conceptual level (CL), transfer of training, and treatment (coached, uncoached) were explored. A multiple regression of treatment condition and conceptual level on transfer of training computed for the total teacher sample ($n = 17$) yielded an $R^2$ of .37 (df 2,14; $F = 4.19$, $p<.05$). Teacher CL contributed very little to the equation. CL correlated only .06 with transfer of training, while coaching correlated .60. In a simple linear regression of coaching on transfer of training, an $R^2$ of .37 was obtained (df 1,15; $F = 8.29$, $p<.01$).

TIS data collected during the treatment period and teaching of the experimental unit corroborate the effects of coaching on transfer of training. A primary effect of these particular models of teaching was to increase the information processing of both students and teachers at the conceptual and theoretical levels. A second effect was to increase overall time spent in information processing, as compared with interaction in structuring and feedback.

Observational data (TIS) were collected in teachers' classrooms during four distinct periods: baseline data (before training occurred), skill-level data (during initial training--one observation for each of the three models taught), treatment/control data (during the coaching phase of the training), and transfer task data (during teaching of an experimental unit).

During baseline observations individual teachers varied considerably from the mean on nearly all indices. The coached and uncoached groups, however, varied significantly on only three dimensions (see Table 3). The uncoached teachers spent significantly more time talking than did the coached teachers ($p < .05$) and thus significantly more time at the factual level of information processing ($p < .05$). (At baseline, none of the teachers was engaging in much information processing at the conceptual or theoretical levels. During the first round of observations, the mean numbers of communication for all teachers, adjusted for time, was 40.45 for factual information processing, 5.77 for conceptual information processing and .11 for theoretical information processing.) At baseline, the uncoached group was also providing more feedback to students than was the coached group. (Teachers were not actually assigned to coaching/non-coaching groups until the completion of initial training. However, the first two rounds of data collection--baseline and skill level--were examined by groups to determine if teachers in the two treatments were significantly different on any dimensions prior to or during initial training.)

No significant differences resulted between groups during the skill level data collection, and individual differences between teachers were greatly reduced from baseline levels. The effect of training in the three models was to increase similarities on all TIS indices and reduce variance

### TABLE 3
### Mean Frequencies for Coached and Uncoached Teachers on TIS Scales at Baseline, Skill Checks, Treatment, and Transfer Task

| | Factual | Conceptual | Theoretical | Total Info Pro | Structure | Feedback |
|---|---|---|---|---|---|---|
| Baseline | | | | | | |
| Coached | 26.67 | 6.78 | .11 | 38.50 | 31.30 | 8.24 |
| Uncoached | 45.38 | 3.60 | .00 | 55.06 | 33.11 | 17.51 |
| Skill Level | | | | | | |
| Coached | 24.00 | 33.78 | 5.88 | 60.43 | 17.35 | 13.93 |
| Uncoached | 23.75 | 32.50 | 6.50 | 63.26 | 19.29 | 15.52 |
| Treatment | | | | | | |
| Coached | 28.11 | 11.22 | 1.33 | 46.61 | 13.68 | 10.21 |
| Uncoached | 40.87 | 3.87 | .12 | 49.60 | 15.09 | 12.73 |
| Transfer Task | | | | | | |
| Coached | 34.67 | 11.44 | 3.33 | 54.94 | 18.57 | 12.47 |
| Uncoached | 40.25 | 6.62 | 1.62 | 54.46 | 15.23 | 12.73 |

Factual - Teacher and student information processing at the factual level.
Conceptual - Teacher and student information processing at the conceptual level.
Theoretical - Teacher and student information processing at the theoretical level.
Total Info Pro - Teacher and student information processing for all categories.
Structure - Teacher structuring communication.
Feedback - Teacher feedback to students.

within each index. Behaviors required by each of the new models were consistently exhibited across teachers and, during the "on-demand performances," replaced normal teaching styles exhibited during baseline observation.

The greatest variation between teachers during the skill-checking period was in ability to ask questions and elicit answers at the theoretical level of information processing. (Teachers ranged from 0 to 23 occurrences of this behavior while using one of the models requiring theoretical reasoning at the final phases.) However, the coached and uncoached teacher groups scored means of 5.88 and 6.50 respectively on this dimension at the completion of initial training.

At the beginning of the second treatment phase, 9 of the 17 teachers were randomly assigned to a coaching treatment (blocking on conceptual level) with the remaining 8 teachers serving as controls. Uncoached teachers again exceeded coached teachers in instructional time spent at the factual level of information processing ($F = 3.16$, $p < .09$) while coached teachers spent significantly more time than uncoached teachers at the conceptual level of information processing. As at baseline, uncoached teachers spent significantly more time in all categories of teacher talk than did coached teachers ($F = 5.15$, $p < .04$).

Although classroom observations continued for uncoached teachers during the second treatment phase (coaching) and thus some pressure existed for all teachers to use the newly learned models of instruction, uncoached teachers returned to patterns of teaching behavior exhibited during baseline observations.

Coached teachers appeared also to move in the direction of baseline behaviors during the coaching treatment. However, it should be noted that skill level behavior for all teachers represented a horizontal transfer task. Teachers tended to teach lessons in their classrooms which were first practiced in the training setting and which often were modeled after demonstration lessons rather than designed to integrate with their own curriculum. During the second treatment phase, coached teachers were faced with the task of designing lessons within the context of their on-going curriculum and instructional objectives and teaching newly designed lessons which had not been practiced. Final lessons taught by coached teachers during this phase resembled skill level patterns more closely than means for the entire treatment phase would suggest.

During teaching of the final unit, coached teachers spent approximately twice as much instructional time at the conceptual and theoretical levels of information processing as did uncoached teachers (see Table 4). For all teachers who used the models during the transfer teaching task (five coached and two uncoached teachers), percentage of time spent in higher order thinking processes with students exceeded the means for the coached group. Examination of extreme groups within the coaching group, however, revealed the greatest differences in instructional behavior. Mean scores for the five high transfer teachers were 17.6 and 2.8 respectively for conceptual and theoretical information processing and 3.75 and 4.00 for the four low transfer teachers.

The regression of coaching on transfer of training, supported by the results of observational data collected in classrooms, indicated a significant effect for coaching on transfer of training. Teachers who were

TABLE 4

Mean Frequencies for Teacher/Student Interaction at Three Levels of Information Processing During Transfer Task for High and Low Transfer Teachers

| | $\overline{X}$ Transfer Scores | Factual Info Pro | Conceptual Info Pro | Theoretical Info Pro |
|---|---|---|---|---|
| Hi Transfer Coached Teachers (n = 5) | 14.80<br>(SD = 1.92) | 36.0 | 17.6 | 2.8 |
| Lo Transfer Coached Teachers (n = 4) | 7.75<br>(SD = 2.36) | 33.0 | 3.7 | 4.0 |
| Hi Transfer Uncoached Teachers (n = 3) | 10.67<br>(SD = 2.08) | 38.0 | 10.3 | 2.3 |
| Lo Transfer Uncoached Teachers (n = 5) | 2.80<br>(SD = .45) | 41.6 | 4.4 | 1.2 |

not coached tended to discontinue use of the new models after initial training, and on the transfer task, were much less likely to use any of the trained strategies in their teaching of the experimental unit.

## Problems of Transfer

A major objective of this study was, through observations and interviews, to understand the difficulties teachers experienced as they attempted to transfer new patterns of teaching behavior into their instructional repertoires. Both coached and uncoached teachers were studied to determine what problems they encountered as they attempted to transfer new teaching models into their instructional behaviors and to understand the contribution, if any, of coaching to teachers' success in transferring training to classroom practice.

Intention to transfer training. Following initial skills training in three new models of teaching but prior to the transfer period (during which half the teachers would be coached), all project teachers were interviewed regarding their intentions to use the new strategies. Sixteen of the 17 teachers said they definitely intended to use the new instructional models in their classrooms. Among the reasons cited for probable future use were "they increase student participation" (3), "they're motivating, kids like them" (5), "students retain more of the material taught" (4), "they are appropriate for what I teach" (4), "develops thinking, helps kids make connections" (4). Reasons mentioned by fewer than three teachers included "I like the variety for myself," "they accomplish things other strategies can't," and "I like to teach successful lessons." Some reservations were expressed by teachers who said they intended to use the models in the future, including fears that students might perceive the activities as games (3), preparing materials and reorganizing/rethinking curriculum for the models would be too time-consuming (4), and final phases of each model perceived as too difficult for students (2).

One additional teacher responded that he would try the models again only because he was not yet clear just what he could accomplish with them and felt further testing was necessary. Finally, one teacher responded "probably not" to the question of further use, explaining that she taught basic skills to low ability students and felt direct instruction methods were more appropriate and economical for her purposes. However, she expressed surprise that her "low level" students were able to cope successfully with the trial lessons for each model.

In late May/early June all teachers were again asked if they intended to use these strategies in the future (1982-83 academic year). At this point, half the teachers had received coaching and thus had generally more practice with the models than uncoached teachers who tended not to use the models after the initial training period. However, 16 of the 17 project teachers again reported an intention to use some or all the models for future teaching. Nearly all teachers expressed preferences for certain models over others, but no consistent pattern emerged for the teachers as a group. Again, one teacher said she did not intend to use the models but then modified her response to say she might occasionally use concept attainment or Taba "as a fun activity but certainly not on a regular basis."

Difficulties of transfer. Transfer of training was hypothesized to be a problem for several reasons. The most compelling, of course, was a training literature that reported the infrequency of implementation for new knowledge and skills. Throughout this study, we watched closely for events, statements, and behaviors which might help identify difficulties in using the strategies or reticence to use them. In addition, we directly questioned all teachers regarding problems they encountered in attempting to use the trained teaching skills. We had hypothesized that transfer might be stymied by the discomfort of using a strategy awkwardly and unskillfully, a lack of understanding of how to teach students to respond to new teaching behaviors, and uncertainty regarding the appropriate meshing of a new teaching strategy with existing curriculum and instructional objectives. These hypotheses gained considerable support, both from our observations and teacher interviews, and additional concerns were surfaced as well. Teacher perceptions of the difficulties of transferring training in new teaching strategies to their active instructional repertoires centered on appropriateness of the models for their curriculum, time constraints, student response to the strategies and personal feelings and preferences with respect to the new models of teaching.

At the close of the project, 5 of the 17 teachers (4 of them uncoached) reported that the models did not "fit" what they taught; they had difficulty defining concepts to teach with the models and selecting appropriate objectives to aim for. Several of these teachers added that they feared a loss of control over student cognitive processes when using the strategies and could not be confident the students would gain the understandings they (the teachers) had intended.

Time constraints were mentioned in several contexts as impeding use of newly learned strategies. Some teachers simply reported that the time required to practice and master the new strategies presented barriers to their use. Because these teachers were hesitant to try the models with their students until they had mastered the new behaviors, and because time for practice never seemed to be available, the strategies never got used. Teachers were divided in their estimates of efficiency with the models. While some felt the new strategies were extremely economical, accomplishing learning objectives in a fraction of the time normally required, others felt the models were uneconomical in terms of efficiency (although some reported using one of the models to accomplish objectives they had been unable to accomplish with a recitation strategy). Finally, several teachers cited the need for adjusting instructional schedules as an impediment to use. They were accustomed to viewing the 40-minute period as a time slot with a definite beginning, middle and end. The tendency for lessons with some models to last for two or three periods (days) created dissonance for teachers who thought about teaching in discrete time blocks.

Student responses to the lessons were mentioned by five teachers as inhibiting use of the models. Several teachers feared their students would devalue strategies which were enjoyable (one teacher said "game-like") or oral (as contrasted with their usual paper and pencil tasks). Some teachers thought the models made unrealistic intellectual demands on their students beyond their ability and maturity, and a couple of teachers asserted that their students would reject such "difficult lessons."

Finally, teachers' personal feelings and perceptions about the models influenced their ability or willingness to transfer the new strategies into their classroom practice. Teacher statements in this vein included feelings that the models were difficult to master, fears that student behavior problems would increase if they tried the new strategies, and anxiety about observers in the classroom.

Staff estimates of transfer problems. Observations of and conversations with project teachers yielded basically the same categories of transfer of training problems as teachers reported, although staff interpretations of the difficulties experienced sometimes differed from those of the teachers. We agreed with teachers that a major obstacle to transferring the new models to the workplace lay in selecting appropriate occasions for use of the trained strategies in terms of curriculum and instructional objectives. Our observations/conversations suggested that teachers either could not frame objectives for which the models would be facilitative, could not conceive of their curriculum in terms of concepts to be acquired (as opposed to activities to be completed), and/or used the models in ways for which they were not designed (e.g., Bruner's Concept Attainment strategy as a review of material presented didactically).

Teachers who mastered skills required by the strategies and modeled the P.I.'s demonstration lessons for their peer teaches and skill checks but never understood how a specific model fit into their own curriculum, generally found it impossible to use the new strategies on a regular basis. Our impression was that the organization of publishers' materials so strongly influenced teachers' conception of their curriculum that different organization of the same material was not considered by most teachers. An example of this difficulty was a seventh-grade social studies teacher working with a text in which "Maps" was a separate section at the end of the book. When asked what his objectives were and what concepts he hoped to teach in the coming weeks, he answered "Maps" because he had already "covered" the rest of the text. Similarly, teachers working with language arts texts that stressed a structural approach to language use (e.g., parts of speech, various kinds of phrases and clauses, punctuation, spelling, etc.) found it difficult to utilize strategies that focused on links between thinking and writing (e.g., imaginative stories and poems, building an argument for a position and supporting it with evidence and examples). Thus, teachers who had difficulty finding a fit between the teaching strategies and their curriculum seemed to us to have difficulty "thinking" with the new models of teaching because of a unidimensional conception of instructional objectives.

A second influence on teacher ability to match the new teaching strategies with curricular objectives seemed to be practice, or number of trials with the trained models. Teachers who tried each model several times immediately following initial training appeared to "teach themselves" the potential uses for each model. Not only did they develop technical competence with the models and teach their students how to respond to the strategies, but in the process of practicing began to develop their own understanding of what could be accomplished with each method of teaching. Possibilities for use grew exponentially for the teachers who practiced the strategies frequently, as applications occurred to them in other subjects they taught. In our view, cognitions surrounding the fit between teaching strategies and curricular objectives and amount of practice were related to the problems with time mentioned by some teachers as a barrier to transfer.

The difficulty with framing objectives appropriate for the trained strategies was especially clear during the transfer task. Six of the coached teachers and three of the uncoached teachers set instructional objectives consistent with the trained models of teaching (e.g., "awareness of cultural differences," "tolerance for other life styles," "understanding of community and family relationships," etc.). Five of the six coached teachers who set objectives appropriate for the new teaching strategies did, in fact, use the strategies in their teaching of the final unit, as did two of the three uncoached teachers with instructional objectives appropriate for the models. The remaining teachers used the experimental unit to "cover the facts," "teach outlining skills" and "check vocabulary knowledge and reading comprehension," and subsequently reported that "the strategies did not fit the curriculum."

Staff and teacher perceptions of difficulties with teaching students to respond to the new instructional strategies were quite similar. Beliefs about student abilities (e.g., "the models are too hard for the students") may have masked teachers' personal discomfort with questions having more than one correct answer. Two of the teachers were extremely uncomfortable with the Taba strategy, for example, because they could not know in advance what data students would generate and into which categories they would group the data. Generally, however, students appeared to adapt to expectations imposed by the new strategies whenever their teachers practiced them several times.

The personal concerns expressed by some teachers (e.g., difficulty of the models, fears of loss of control) generally were seen by project staff as the normal anxiety accompanying experiments with new behavior. Although a couple of teachers were genuinely anxious (e.g., "I always miss the point," "I'm not a good writer myself"), others who cited personal preferences as an obstacle to transferring the new models to their teaching repertoires seemed comfortable with their present teaching style and disinterested in building repertoire.

Teachers and project staff agreed that time would be required to master the new teaching strategies and integrate them into instructional behavior. Teachers who were most successful in transferring training to their classrooms, however, were much more realistic about what the additional time would entail. They were quicker to grasp the potential of the models for advancing their goals and the necessity for reorganizing curricular materials and objectives for use with the models. Teachers who did not transfer training to the classroom seemed to think the additional time required simply would entail reworking existing lesson plans.

Project staff perceived an additional constraint on transfer of training not mentioned by any of the participants--the structure of the schools in which teachers worked. When asked at the end of the project if support or indifference for their experimentation with new teaching behaviors occurred during the study, teachers from the same schools reported both support and indifference from the same principals and the same colleagues! Apparently, teachers who sought out their principals and other teachers to share their experience felt they received encouragement for their efforts, while teachers who were silent about their participation in the project reported support only from their students. For 15 of the 17 project teachers, there was no formal structure within their schools for ongoing discussion about curriculum and instruction. None of the teachers regularly observed other teachers in their classrooms, although occasionally teachers could visit another program and have their substitute teachers paid for by the local teacher center. Because the structure of these schools did not encourage teacher contact around the clinical act of teaching, only the most proactive were able to break out of their isolation and share what they were doing with principals or peers. Interestingly, teachers who were the only participants in their buildings assumed that teachers from the same buildings were sharing their experiences, lesson planning, frustrations, etc., whereas this actually occurred in only one school on a regular basis.

## Conceptual Level and Transfer of Training

As was mentioned earlier, following initial training teachers were stratified by conceptual level before random assignment to either a coaching or non-coaching treatment. It was hypothesized that high CL teachers would more easily integrate new teaching strategies into their instructional repertoire than would low CL teachers. While coaching was predicted to facilitate transfer of training for all teachers assigned to that treatment, regardless of CL level, it was thought that high CL teachers who were not coached might surpass their low CL counterparts who were coached on ability to transfer.

Although the small sample size in this study precludes any sweeping generalizations with respect to teacher CL effects on transfer of training, CL did not function exactly as predicted. In the coached group, high CL teachers transferred training to their classroom behavior at a much greater rate than low CL coached teachers. Surprisingly, however, as a group low CL coached teachers surpassed both high and low CL uncoached teachers in their ability to use new teaching strategies skillfully and appropriately in the classroom (see Table 5).

## Transfer of Training and Student Outcomes

While the central question in this study was to determine if coaching facilitated transfer of training, ultimately our concern is with effects of curriculum and instruction on student learning. In this study, we hypothesized that teachers who transferred new models of teaching into their repertoire would be more likely to use those strategies during the teaching of an experimental unit than teachers who did not transfer training. Furthermore, it was hypothesized that students of high transfer teachers would achieve as well as students of low transfer teachers on a factual recall test and better on an essay test requiring comparison, abstraction, and integration of themes presented in the materials.

As was reported in an earlier section, five of the nine coached teachers used the new models a total of nine times in their teaching of the experimental unit, while two of the eight uncoached teachers used the new models a total of two times.

To examine the relationship between teacher transfer of training and student recall and essay scores on the unit taught by all teachers, multiple regression was employed. Students were used as the unit of analysis, with teacher transfer scores assigned to all students in each teachers' class.

Two classes were not included in this analysis. One class which had a small enrollment in January suffered greater than 50 percent attrition during the project and in June only two students remained with complete data sets. A second class was excluded because the teacher was reassigned to a new class in March. The remaining student sample included 256 students in 15 classrooms.

TABLE 5
Transfer of Training Scores for High and Low CL Teachers

| | Coached | Uncoached |
|---|---|---|
| Hi CL | $\bar{x}$ = 13.60<br>S.D. = 3.65<br>(n = 5) | $\bar{x}$ = 5.50<br>S.D. = 5.00<br>(n = 4) |
| Lo CL | $\bar{x}$ = 9.25<br>S.D. = 3.95<br>(n = 4) | $\bar{x}$ = 6.00<br>S.D. = 4.08<br>(n = 4) |

As can be seen in Table 6 both student verbal ability and teacher transfer of training had a higher positive correlation with student recall than with essay scores. A multiple regression of student verbal ability and teacher transfer of training on recall and essay scores yielded $R^2$s of .03 (df 2,253; F = 3.49, p<.05) and .001 (df 2,253; F = 1.05, ns) respectively. When student verbal ability and coaching were regressed on recall and essay scores, nonsignificant F ratios were obtained for both.

TABLE 6

Correlation of Student Recall and Essay Scores with Student Verbal Ability and Teacher Transfer of Training

| | Student Verbal Ability | Teacher Transfer of Training |
|---|---|---|
| Recall | .12 | .11 |
| Essay | .03 | .01 |

## Development of a Coaching Technology

An analysis of the literature on teacher training and curriculum implementation illustrated both the difficulty of changing behavior and the availability of promising practices where new skills, strategies, and curricula have been successfully implemented. Follow-up training in classrooms or schools following initial large group training appeared to increase the probability that new behaviors would be incorporated into the instructional repertoires of teachers, but the structure of that additional training was not always clear. Part of our task in this study was to develop a technology for working with teachers that would build on initial training but focus on transfer of that training to the workplace. While we predicted that an extended treatment, or "coaching" of teachers in their classrooms, would involve support, encouragement and companionship for teachers as they attempted new teaching behaviors and assistance with technical difficulties with and appropriate uses of new models of teaching, it was unclear in just what proportions these elements would be necessary or for how long. Soon after the coaching treatment was begun, it quickly became apparent that, despite a relatively small sample, teachers varied considerably in their need for and ability to use the various elements of coaching. Consequently, several case studies of individual teacher's responses to coaching were developed to explore relationships of each teacher's normal approach to teaching and responsiveness to training with actual performance during and following training. Appendix D provides an example of a case study for a coached teacher.

Although teachers varied in their need for and response to coaching, common patterns emerged for all teachers as the treatment was implemented. First, the "coach" discussed with each teacher his/her instructional objectives for the coming weeks, intending to move directly to plans for matching the new teaching strategies with existing objectives where appropriate. In fact, for most teachers, framing objectives and organizing curriculum/materials appropriate for use with the teaching strategies became the central focus of the coaching sessions.

A second frequent activity during the coaching sessions was actual lesson planning. Having selected an instructional objective, the coach and teacher often proceeded to locate and organize materials and prepare teacher statements and strategies for each phase of a teaching model.

Conferences following observations of these lessons more nearly resembled traditional supervision techniques, with teacher and coach critiquing the technical aspects of the strategy used, the success of the lesson in terms of accomplished objectives, and student responses to the strategy, followed by plans for future lessons.

Teachers varied most widely in their need for support and encouragement during this process. Generally, the coach responded to teacher cues in providing support. If teachers expressed anxiety, disappointment and/or frustration with the process, the coach responded with reassurance, encouragement, suggestions, and offers of help (e.g., joint teaching of a lesson, locating additional materials, etc.). However, when teachers approached the coaching conferences in a comfortable, matter-of-fact way, evaluating their own performance and that of their students, proceeding directly into plans for future lessons, the coach provided little supportive feedback. An exception was the coach's consistent feedback with respect to particularly successful teacher or student moves during the observed lesson.

When asked to evaluate the utility of the coaching treatment at the end of the project, eight of the nine coached teachers felt it had been extremely useful. Most said they probably would not have continued to use the models had we not engaged in specific lesson planning together, and joint planning (e.g., the fitting of strategies to curriculum and objectives) was perceived as the most helpful aspect of coaching.

## DISCUSSION

This study investigated the contribution of a coaching treatment to teachers' ability to transfer training into their active teaching repertoires. Coaching was hypothesized to facilitate transfer of training, and teacher transfer of training was predicted to be associated positively with greater student achievement on an essay test. In this study coaching strongly influenced teacher transfer of training but transfer of training did not affect student outcomes in the ways predicted. The following discussion considers factors which appear to have influenced the results.

### Coaching and Transfer of Training

Factors associated with the coaching treatment which appeared to contribute to successful transfer of training included practice with and cognitions regarding the new models of teaching, successful experiences with the trained strategies, and understanding of the requirements of transfer.

The greater practice of the trained models attributable to coaching seemed to increase not only skill but comfort in performing the new teaching behaviors. It seems fair to assume that increased skill and ease with the trained models contributed to greater use for the coached teachers, given that all teachers expressed intentions to use the new behaviors in their teaching. A more important factor, however, was teacher cognitions related to the trained strategies. Coaching directly addressed the problem of thinking in terms of teaching repertoire, of setting various levels and kinds of instructional objectives for which varying teaching strategies would be appropriate. Teachers who were positive toward the content and process of the training and were willing to practice the new models of teaching in their classrooms but who could not think conceptually about what they taught and how they taught it had difficulty in using the models, other than as fun, singular activities unrelated to their mainstream instruction.

A critical effect of the coaching treatment appeared to be a near-guarantee of a successful teaching experience with one or more of the models. One such experience seemed to clarify potential uses of a strategy, decrease anxiety or tension related to the technical aspects of the model and provide reinforcement of the teacher by his/her students. While this experience happened at different times for different teachers during the coaching treatment, the result was fairly uniform. Teachers became more proactive in the coaching conferences, controlling both the content and process of the sessions with their own agendas. Repertoire seemed to become a real concept at this point. For teachers who experienced success early in the treatment, coaching accomplished more of its aim of transferred training than for teachers who experienced success late in the training.

Although the difficulties inherent in transferring training were forecast for all teachers during initial skills training, coached teachers generally exhibited a greater understanding of the requirements of transfer. Statements reflecting this understanding (taken from interviews with all teachers) were nearly always contributed by coached teachers. Comments included the need for more practice in order to understand the uses of a model and what students could do with it, the difficulty of thinking about appropriate applications and the necessity of allowing students the intellectual independence fostered by some of the models. Essentially the teachers came to understand that one or two trials with a new strategy was unlikely to add that strategy to their repertoire. In addition to their understanding of the need for practice with the models, adaptation to students and flexibility in their own approaches to teaching, these teachers appeared to embrace the new. Their openness seemed to reflect a willingness to include alternatives, a desire to "stretch" themselves professionally.

## Teacher CL, Coaching and Transfer of Training

Conceptual level operated as predicted for coached teachers, with high CL teachers transferring training more successfully than low CL teachers. For uncoached teachers, however, no transfer differences existed for high and low CL subjects. It is possible that variables other than CL were operating to facilitate or impede transfer of training (e.g., Doyle and Ponders' "practicality ethic" [1977] or the differential learning and implementation rates discussed by Hall [1980] and seen in the lag effect reported by Sharan and Hertz-Lazarowitz [1982]). However, in this study, coaching seems to have been a necessary condition for transfer of training, and teacher conceptual level did not override this treatment.

## Student Outcomes

We predicted that students of high transfer teachers would perform as well as students of low transfer teachers on recall tests and better on essay tests, following a unit taught by all teachers. Contrary to expectations, students of high transfer teachers performed better than students of low transfer teachers on recall tests and no differently on essay tests. Although differences favoring the high transfer teachers on the recall test were statistically significant, they were actually fairly small.

Two conditions were observed that might account for findings of little or no difference on student outcome measures. First, all teachers worked extremely hard on preparations for and actual teaching of the experimental unit. Several of the uncoached teachers radically altered their teaching style, exhibiting patterns we had not seen in the previous five months. For example, a teacher who, on every occasion we observed (except for the skills checks on the new models) had assigned individual seatwork which she monitored largely from her desk, chose during the unit to organize her students into teams to write dialog for role plays of life in Roussillon. These role plays were then videotaped and edited into a single classroom production depicting the life and times of Roussillon. Nothing in this teacher's previous behavior, nor, unfortunately, in our training, prepared us for this one-week virtuoso performance.

A second possible explanation for the obtained patterns of student outcomes may have been an interaction of teacher conceptual level, treatment (coached/uncoached), and transfer of training with student verbal ability. Visual examination of student verbal scores by classroom suggested the possibility of cohort effects, with some classes having a concentration of either high or low ability students. Subtle norms for achievement expectations tend to form for both teachers and students in such situations, but it is unclear at this time if and how such norms may have interacted with other variables studied in this research.

## School Organization

For all but the most proactive teachers in this project, little support existed in school environments for experimentation with new teaching behaviors. Even in schools where grade-level teams met regularly, interaction often centered on procedural matters, such as grade reports and parent conferences, or students with discipline problems. For the most part, it was only when teachers created time outside regular meetings that they had an opportunity to discuss curriculum and instruction in substantive ways.

Joyce, Bush, and McKibbin (1982), in their California Staff Development Study, suggested the presence of an interaction between school environment (emerging, maintaining, depressive) and teachers' individual growth states (omnimores, active and passive consumers, retrenched and withdrawn) when discussing responses to inservice opportunities. Using their typology informally (no data were formally collected to categorize teachers and schools in the present study on these dimensions), it seems probable that our low transfer teachers were passive consumers in maintaining or depressive schools. It is likely that without the support and norms resulting from school wide inservice programs, teachers may find it difficult to sustain the effort necessary for changing instructional practice. The coaching by an outside consultant apparently provided some of the support lacking in school environments, as was evident in the transfer scores of coached teachers. It is unrealistic, however, to view the services of consultants as a substitute for ongoing collegial coaching of clinical teaching.

## Recommendations

The results of this study have implications for the design and implementation of inservice programs, for policy affecting those programs, and for future investigations into the nature of transfer of training.

First, when addition to repertoire is the intent of training, inservice programs must be much more extensive than has often been the case. Theory undergirding proposed new teaching behaviors must be fully explicated if teachers are to understand the kinds of outcomes expected for students and use the new behavior appropriately. Multiple demonstrations of new strategies or models of teaching clarify skills essential for the performance of the strategies and build theoretical understanding as teachers experience the learners' role in responding to the demands of a strategy. Practice with feedback in the training setting develops technical skill with the new strategies, and in the present study, was perceived as the single most valuable skill-building component during initial training.

Despite the inclusion of theory, demonstration, practice, and feedback, the results of this study strongly support the contention that without coaching of teachers as they attempt to integrate new teaching models into their instructional repertoires, transfer of training will not occur for most teachers. Coached subjects in our study were quite candid in admitting that without coaching they would have discontinued use of the new strategies. Coaching appears to be a necessary condition for transfer of training when the object of training is the building of repertoire.

It is probable that for the coaching of teaching to occur on a broad-scaled basis, peer coaches will have to be trained to provide coaching for each other. Peer coaching will necessitate some organizational changes for most schools, if time for observation and conferencing of teachers by teachers is to be possible. Furthermore, the establishment of the conditions for peer coaching will necessitate the building of school norms which encourage and legitimize ongoing collegial attention to curriculum and instruction. Without the development of a school climate supportive of innovation and change, it is unlikely that any but the most highly motivated and self-directed of teachers will be able to sustain peer coaching relationships over long periods of time.

The design and implementation of fully elaborated training systems has implications for policy makers responsible for the allocation of resources to inservice programs. Current practice often dictates the allocation of inservice funds across a broad range of topics and activities. Results of the present study suggest that the concentration of resources on fewer areas might be more efficient when the objective is transfer of new knowledge and skill into classroom practice. When, on the other hand, the goal of an activity is to create awareness of an area, a single workshop or presentation might be the more appropriate training activity.

A fully elaborated training program has significant implications for decision makers in the area of program evaluation as well. The frustration and futility of measuring student effects from a program never fully implemented has been a common experience. Results from this study support the addition of a coaching process to strengthen our ability to measure the effects on students of specific materials and strategies. Only when teachers have transferred training content to classroom practice is it reasonable to inquire into the effects of that content on students.

Future investigations of the links between training and transfer of training should address the interaction of individual growth states (responses to inservice opportunities) with school characteristics that support or impede change. The work of Joyce, Bush, and McKibbin (1982) suggests that even passive consumers of training in energizing schools are able to learn and change, while the same teachers in less supportive environments are unlikely even to participate in inservice activities. Furthermore, their work suggests that resistant teachers are neutralized in energizing environments whereas they tend to exert disproportionate negative influence in maintaining or depressive school environments.

In summary, the present study underscored our naivete with respect to the difficulty of changing instructional practices while providing support for the efficacy of coaching in facilitating transfer of training to classroom practice. The most promising direction for future research appears to be the refinement of the coaching technology, the training and study of peer coaching, and the characteristics of individuals and schools which encourage transfer of training.

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# APPENDIX A

## REVIEW OF LITERATURE

# REVIEW OF LITERATURE

## A Summary of Research on Training

This summary and analysis of research on training is part of a larger paper by Bruce Joyce and Beverly Showers, "Teacher Training Research: Working Hypotheses for Program Design and Directions for Further Study," presented at the annual meeting of the American Educational Research Association, Los Angeles April 1981.

For several years we have been directing a considerable portion of our energy to an analysis of the research into how teachers acquire skills and strategies and integrate these into their active repertoire. Our purpose is to develop working hypotheses to guide preservice and inservice training programs and to generate a picture of the present state of knowledge so as to guide current and future research efforts. As in so many areas of educational research, on first looking into the field one is struck by methodological problems, what seem to be inadequate dependent measures and the relatively small amount of research that has been done in an extremely important area. As we became more thoroughly acquainted with the field and decentered somewhat from our own research we began to appreciate how much has, in fact, been learned and, equally important, to develop a sense not only of where there are gaps in the field but how we might interpret studies surrounding those gaps to speculate on what might be found were they to be filled in. Our first examination of the literature simply accumulated investigations as they are found. We gathered together the sets of studies on micro-teaching, mini-courses, simulation, curriculum implementation, interaction analysis, and so on, and developed a report which annotated what we considered to be the better from about 200 studies conducted between 1945 and the present.(1) What was most striking about that first cut was that the better designed studies demonstrated the effectiveness of a variety of training components in assisting teachers toward skill acquisition. Intensive structured feedback, modeling, intensive practice, careful discrimination training, all in their various ways helped teachers acquire the targeted skills. We also began to concern ourselves with the nature of the skills being taught and, increasingly, with the problem of transfer of those skills into the active repertoire of the teacher. We also began to "see" the field differently and to develop a typology for classifying training components or elements and various kinds of outcomes.

## The Distinction Between "Fine Tuning" Skills and the Mastery of New Teaching Strategies or Models

The literature appears to divide between those which focus on what we have come to call the "tuning" of already existent or latent skills and the mastery of patterns of teaching (teaching strategies or models of teaching) which require a major addition to the existing repertoire of the teacher. "Tuning" skills polish and enhance the existing repertoire of the trainee by sharpening the ability to ask questions, to praise and reinforce, to increase the involvement of students, to increase time on task, and to better the clarity and vividness of lectures and illustrations, whereas the mastery of a teaching approach which is not in the "naturally developed" repertoire of the teacher requires the trainee to think differently, organize instruction in fresh ways, to help children adapt to and be comfortable with those new approaches, etc. Overall, we believe, there is more knowledge about how to help teachers "tune" their existing repertoire than there is about how to help them make major additions to it.

## The Concern With Transfer

The majority of investigations in the teacher training area measure the acquisition of knowledge and skill but only a few of even the better studies determine whether those skills are integrated into the teacher's active repertoire so that they persist over a long period of time. At the time that we were engaged in the literature search, Joyce and his associates were reaching the point in their investigation of teachers' ability to acquire new and alternative models of teaching, that they were beginning to turn their attention to the transfer problem.(2) In the early years of their investigations most of their energy was directed toward "answering" questions raised by persons skeptical about whether teachers could in fact learn new and alternative teaching strategies. Their early studies were directed at questions such as:

1) Given intensive training including the study of rationale of new models, demonstration or modeling of them, practice and feedback with them, and on-call demand for them in the classroom, can teachers demonstrate a proficient-appearing version of models of teaching not existing in their previous repertoire?

2) Are "natural" teaching styles relevant to the acquisition of new models? That is, can the more non-directive teachers learn non-directive models more quickly than can relatively directive persons?

3) How does personality (especially conceptual level) affect the acquisition of particular models?

4) How do ideological preferences affect the acquisition of new teaching strategies?

5) Can teachers using models they have been taught generate student outcomes appropriate to the models which are being used?

By the mid-1970s (see the studies cited in Table 1) their investigations had demonstrated that most preservice and inservice teacher candidates could acquire a number of models of teaching provided that intensive training was provided, that higher CL teachers acquired additional repertoire more easily than low CL teachers, that there was little if any relationship between natural

## TABLE ONE

### Models of Teaching Training Systems: Selected Related Research

| Focus of Study | Investigator (date) | Models Investigated | Independent Variables | Dependent Variables (Measures) | Sample | Results | Comments |
|---|---|---|---|---|---|---|---|
| Training Elements | O'Donnell (1974) (3) | Advance Organizer<br>Synectics | Training: Theory, Demonstration, Practice, Feedback | Skill in Model Performance<br>(Clinical Analysis Interaction Analysis) | 30 preservice candidates | 90% of Subjects performed Models at Acceptable Levels | Tested effectiveness of training paradigm to skill level. |
|  | Joyce, Weil, Wald (1981) (4) | Concept Attainment<br>Synectics<br>Group Investigation | Training: Theory, Demonstration, Practice, Feedback.<br>Personality: Conceptual Level<br>Natural Teaching Style | Skill in Model Performance (Clinical Analysis, Interaction Analysis, Interaction Analysis) | 30 preservice candidates | Teaching Behavior Shifted in Appropriate Directions when Attempting to Use Models | Conceptual Level Influenced Style but did not inhibit training effects<br>Characteristics of Normal Teaching Style Did not Affect Training Results |
|  | Kelly (1973) (5) | Repertoires of Four Models | Training: Theory, Demonstration, Practice, Feedback<br>Natural Teaching Style | Skill in Model Performance (Clinical Analysis, Interaction Analysis) | 30 inservice Teachers | Teachers displayed skills of models for "on call" observations | Teachers varied in voluntary use of Models |
|  | Brown/Shigaki (1967) (6) | Repertoire of Models | Training: Theory, Demonstration, Practice, Feedback<br>Personality Conceptual level |  | 30 teachers | Acquisition of repertoire displayed in "on call" observations. Personality related to natural styles. | Need for coaching apparent |
|  | Tinsman (1971) (7) | Three Strategies | Training: Feedback, over 30 weeks<br>Personality: conceptual level<br>Demonstrates: three styles |  | 30 preservice | Feedback only relatively ineffective in changing styles<br>Personality related to "natural" styles<br>Demonstration effective in inducing model skills | Need for modelling established. Confirms research by others. (Table Three)<br>Ease of acquisition of new skills with intensive modelling-feedback treatment established |
|  | Murphy and Brown (1970) (8) | As Repertoire | Training, Utilization of the theory demonstration, practice, feedback<br>Personality: conceptual level | Skill and Model performance (Clinical Analysis, interaction analysis) | 30 Home Economics Teachers | Acquisition of repertoire displayed in on-call observations.<br>Personality related to natural styles and acquisition of models. | Applicability to preparation of home economics teachers demonstrated. |
|  | McKibbin (1981) (9) | A repertoire of eight models | Training with an emphasis on coaching | Transfer of Model into Reportoire | 20 inservice teachers | Psychological states relevant to transfer | The need for intensive coaching especially of teacher of low CL |

teaching styles and the acquisition of any particular model, and that ideological preferences generally had a minimal effect on model acquisition, and finally, that skill training appeared to be model specific rather than acting as a generic facilitator. However, although their early studies did not address the problem specifically, reports from the hundreds of teachers in their studies appeared to indicate a wide variation in transfer from the training into regular and active use in the ongoing repertoire. McKibbin and Joyce's study of teachers over a four-year period indicated that the psychological state of the teacher (using Maslow's paradigm) was an important variable in the use of a variety of models and skills taught over a long period of time. Thus we became concerned in our own line of research with an apparent anomoly; we appeared to be able to provide conditions that enabled teachers to acquire complex skills which were almost exotic when described in terms of their existing repertoire but that many of these teachers did not employ those models in the regular and thoughtful way which was intended.

In the traditional literature from psychology, transfer usually refers to "the influence of prior learning upon later learning" (Klausmeier & Davis, 1969) and the distinction is made between lateral and vertical transfer. Transfer is lateral when a person generalizes learning to a new task of the same complexity. An example in teaching occurs when a science teacher, having learned to use advance organizers to structure lectures and readings in chemistry, applies the same techniques to structure lectures and readings in physics. Vertical, or cumulative transfer is the condition in which "knowledge and abilities acquired in performing one task facilitates the learning of higher-order tasks." (Klausmeier & Davis, 1969, p. 1483). An example in teaching occurs when a science teacher who has taken a chemistry course using inductive laboratory exercises, organizes and teaches a course built around inductive laboratory experiences. The skills learned as a student are elevated to the teaching function--a more complex application requiring judgment and management not required in the student role. Essentially transfer can be positive or negative, depending on whether prior learning facilitates or retards future learning, or there can be zero transfer, as when prior learning has no effect on later learning. A primary goal of teachers and teacher educators is positive, cumulative transfer of learning as teaching skills learned in the training setting are applied in the school.

The study of transfer has typically followed a research paradigm in which an experimental group receives training and both the experimental and control group are then tested on a transfer task that is dissimilar in some way to the training task. Posttests for transfer generally follow training by several weeks or months. In contrast, studies of training, which also frequently employ a treatment and control group, seldom check for skill fidelity in applied settings following training. (There are exceptions, of course, e.g., Johnson & Sloat, 1980; Perkins & Atkinson, 1973; Moore & Schaut, 1979.)

The positive, cumulative transfer of learned teaching skills and strategies to classroom practice is enormously complex. Newly acquired skills must be integrated into an existing repertoire of skills and knowledge. Curriculums must be reexamined for appropriate uses of new skills, and goals must be reviewed in relation to new strategies. Thus, learning to perform a new skill or strategy is only the first step toward affecting student outcomes. Transfer of training to the learning environment requires skillful decision making by the classroom teacher and redirection of behavior until the new skill is operating comfortably within the flow of activities in the classroom.

A well-documented example of the difficulty of integrating a new skill can be found in the research on "higher-order" questioning skills. Teachers learned to discriminate higher-order from lower-order questions, to generate examples of each, and to increase their rate of higher-order questions in both micro-teaching and regular classroom environments (Gall, 1978; Winne, 1979). Does this indicate a successful training program? Yes and no. Teachers definitely acquired new knowledge and facility and demonstrated them in teaching situations. However, subsequent research indicated results of no difference or even of student learning decrements for greater rates of higher order questions. Apparently, teacher use of higher order questions results in greater student gains only in very specific situations (e.g., when a foundation of facts is first established,...etc.) (Duncan and Biddle, 1974). The presumption is that the skill as such was learned (the ability to ask higher order questions) but that in the process of transfer the additional and more complex skills involved in slecting and using higher order questions appropriately was not developed. Vertical transfer did not occur where it was needed.

## The Development of a Matrix For Analyzing the Reported Studies

The better research, as we indicated earlier, fell naturally into categories representing orientations toward training. Nearly all of these involved dependent measures of whether a particular skill was obtained by a particular method (structured or unstructured feedback, varieties of micro-teaching, etc.). As we examined the studies we began to isolate descriptors of the training components which were employed and various types of outcomes which were investigated. These are represented in Table Two.

Across the top of the matrix are the categories of training outcomes. The first is knowledge about the skill or a strategy, its rationale, or the theory that undergirds it. Second is performance at a "skill" level. Within this category measures are used to determine whether or not the teacher can produce the skill or model of teaching with reasonable fluidity. The third category is lateral transfer. This category applies to fine tuning skills. Measures are used to determine whether the person can demonstrate the skill in applied settings. The fourth level is vertical transfer and refers to the integration of a new pattern of teaching into the repertoire.

Nearly all the literature employed training which can be described within four components. The first is knowledge-oriented components whereby through presentations, readings and discussions material is made available about the nature of the skill or strategy, its rationale and undergirding theory.

Modeling or demonstration oriented components present a live or mediated depiction of the skill or model in action.

Practice/feedback components involve practice in simulated conditions, meaning any conditions less complex than the ordinary classroom and combinations of structured feedback mediated by self, peers or others.

Coaching refers to the provision of a means for analyzing the teaching situation, determining the appropriateness of the use of the skill, the adaptation of it to learners having various characteristics, and the adjustment of the skill to a variety of teaching situations.

We began to think that the skills that we classify as "fine tuning" of the existing repertoire might involve only lateral transfer whereas skills involving an increase in the repertoire of teaching strategies or the development of the new teaching style would require vertical transfer.

## The Nature of the Literature

Once the matrix was developed we conducted a fresh search of the literature looking for publications relative to the training of inservice and pre-service teachers. Two hundred and eight-two papers were identified although 204 were discarded because they were hortatory, the training elements were not specified, the results of the training were not measured, or further characteristics which prevented placing them within the matrix. Of the remaining 78, others were discarded because they were reviews of other studies, had serious design flows, or because they employed weak treatments. Another search of publications relative to the transfer of training identified an additional 174 studies. Of these 120 were immediately discarded because they were hortatory, but no reported data, and the remaining 54 were further culled because transfer tasks were not clearly specified or tasks were extremely narrow (such as the learning of nonsense syllables) and thus were not relatively generalizable in the sense that we think of transfer.

Sixty-one studies remained after the screening and were placed in the matrix.

Knowledge - studies were placed in this category if subjects could recognize and identify behaviors on paper and pencil tests or on film. Studies reporting attitude changes were also placed in this category (both cognitive behaviors). Attitude changes were measured with self-report paper and pencil tests.

Skill - studies were placed in this category if subjects could perform the trained skill/behaviors in the training session, or in a peer teaching or micro-teaching setting immediately following transfer. (Most studies employ a one-shot measure of competency at the end of training, although some use a

Table Two

Summary of Findings: Studies Reporting Training Elements & Training Effects

Training Elements

| Training Effects | Theory Prsn. | Mod. | Feed-back | Discr. Trng. | Theory Modlg. | Theory Prac. | Theory Fdbk | Prac Fdbk | Th.Mod Pract. | Th.Prct. Fdbk. | Mod.Prc. Fdbk. | Th.Mod. Prc.Fdbk. | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Knowledge | | // | / | | /// | / | / | / | / | | | / | 10 |
| (Attitudes) | | | / | | | / | | | / | // | | | 5 |
| Skills | / /* | /// | | / | /// | // /* | | /* | /// | 𝍸<br>/ | / | //// | 25 + (3*) |
| Horizontal Transfer | // | | | | | / /* | / | | // | 𝍸<br>/**<br>/* /* /* | | 𝍸<br>/ | 18 + (4*) |
| Vertical Transfer | | | / | | | | | | | | | / | 2 |
| | 3 (1*) | 5 | 3 | 1 | 6 | 6 (2*) | 2 | 1 (1*) | 6 | 14 (3*) | 1 | 12 | |

*Study attempted but did not achieve this level of effect.
**Skills maintained @ 5 mo. follow-up but diminished @ 12-month followup.

### TABLE THREE

### STUDIES ANALYZED BY LEVELS OF EFFECTS AND NUMBER OF TRAINING ELEMENTS UTILIZED

| Training Effects | Number of Training Elements | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | Total |
| Knowledge | 4 | 7 | 3 | 1 | 15 |
| Skills | 5 (1*) | 6 (2*) | 10 | 4 | 25 (3*) |
| Horizon.Trans. | 2 | 2 (1*) | 8 (3*) | 6 | 18 (4*) |
| Vert. Trans. | 1 | 0 | 0 | 1 | 2 |
| | 12 (1*) | 15 (3*) | 21 (3*) | 12 | 60 (7*) |

follow-up measure of the behavior in an applied setting.)

Horizontal Transfer - studies were placed in this category if there was evidence of use of trained skills/behaviors in classroom instruction (or during student teaching). Measures of trained skills usually consisted of frequency counts of the trained behaviors; it is possible that in some cases studies classified in this category may have achieved vertical transfer but appropriateness of use and transformation to higher-order tasks was not measured or reported.

Vertical Transfer - the two studies clearly falling into this category were by Brophy & Good, and Neil Jacobson. In the Brophy & Good study, feedback was provided teachers from forty hours of observation in their classrooms. Results were based on forty additional hours of observation following the feedback sessions (a fairly high demand situation, we imagine). The second study was by Neil Jacobson. Couples trained in problem solving strategies for dealing with marital discord reported continued use of the strategies after one year. The additional element of contingency contracting seemed to contribute to high commitment to continuing the strategies (and to a greater level of reported satisfaction with the marital relationship). In both these studies, trained behaviors and strategies appeared to be integrated into a complex environment and transformed for appropriate use as needed. Additional studies which may have achieved vertical transfer but for which this judgment was not possible because of the manner in which results were reported are: Borg, Copeland, Moore and Schaut, Worthen, Zevin, *Dansereau, et al (see starred entries in bibliography).

## Measurement of Dependent Variables

In the studies reviewed knowledge was most often measured by pencil and paper tests and attitudes by inventories. Skills were most frequently measured through observation using systems for categorizing the interaction between teachers and learners or by "clinical rating forms." Transfer was measured either through a self-report by teachers or by observation. Measurement through observation is difficult methodologically because a skill or strategy cannot be expected to occur continuously in a classroom and appropriateness of use is an important criterion. Hence, occasional or even regular visits by an observer may well miss the occasions of appropriate use. Effect on students is either measured by the use of criterial teaching units (Gall, Gage, Joyce, Stallings, Berliner) which are essentially instructional materials accompanied by appropriate tests or by the use of standardized tests which can only be employed when it is deemed that the learning outcome measures are appropriate to the teaching skill or model which is the objective in training.

Of particular interest are the investigations which used various combinations of the training elements and attempted to look at horizontal transfer, especially the comparison of results between those using theory/modeling/practice treatments, theory/practice/feedback treatments and theory/modeling/practice/feedback treatements. There were six of the latter and all of them achieved the horizontal transfer which they were looking for. Of those, the two studies which employed theory/modeling/practice treatments also achieved horizontal transfer, but only five of the nine using theory/practice/feedback treatments achieved horizontal transfer including several which had ascertained that the skills had been developed.

Clearly much more needs to be known about the impact of training components on knowledge acquisition and on relationships between increase in cognition and increase of skills. (Gage and his associates recently reported a study indicating that knowledge acquisition facilitates skill acquisition.) And much more information has been accumulated about horizontal transfer than vertical transfer.

As can be seen from the summary tables, training generally accomplished the objectives toward which it was directed. (Of the 67 studies reviewed here, .896 (60/67) successfully changed or created behavior at the level targeted.) What is often unknown from these studies is other possible effects of training such as transfer or lack of transfer to applied settings.

After the analysis was completed we turned to the literature on the implementation of curricular innovations to determine whether it is congruent with the impressions derived from the literature on training.

## Implementation of Innovations

The period from the late 1950s to the early 1970s saw the introduction of a great number of innovations in the organization of schools and in school staffs (largely various forms of "differentiated staffing" or "team teaching"), specific curriculums (the "new" science and mathematics, alternative approaches to the Social Studies, etc.) and general approaches to schooling (e.g., the open classroom). By the end of that period it had become apparent that the degree of these implementations had varied quite widely and that even the well implemented instances had been eroded by time (see Goodlad & Klein, 1970; Weiss, 1978; Berman & McLaughlin, 1978). Informal observations, surveys, and formal evaluations of curriculums have produced findings generally congruent with the above assertions. That is, there is great variability even within sites with respect to the implementation of curriculums--even well implemented curricular and organization changes tend to disappear fairly rapidly.

What is of concern here is to determine whether there are parallels in the curriculum implementation literature and the training literature. In both cases we have a problem that the literature is uneven and that relatively few studies permit us to make firm inferences about the relationship between the strategies that are employed and the degree of use, especially over the long term. Fullan and Pomfret (1977) identified dimensions of implementation: understanding of the rationale of a curriculum, the use of appropriate materials and instructional processes, appropriate changes between the role relationships of teachers and students, and appropriate evaluation--and suggested that the degree to which these dimensions are used varies considerably. They observed, in fact, that the utilization of instructional materials is more likely to occur than a change in instructional process, pupil/teacher role relationships, or evaluation.

Notwithstanding the difficulties, we have attempted to determine the degree of match between the working hypotheses we have generated in the training literature and the better studies in curriculum implementation. Looking at the studies by Gross, et al., (1971), Charters and Pellegrin (1974), Crowther, (1972), Downey (1975), Lukas and Wohlleb (1973) and Nauman-Etienne (1974), Fullan and Pomfret suggest that the less explicit the characteristics and rationale of the innovation, the more likely there will be user confusion and frustration and a low degree of implementation. This is similar to our contention that an understanding of a theory of an approach to teaching contributes to the development of skill and ultimately to its use.

In both cases what it seems to boil down to is the common-sense proposition that the more thoroughly one understands something the more likely one is to be able to learn how to use it and be committed to using it.

Second, although Fullan and Pomfret do not discriminate between various aspects of training, they have examined the inclusion of inservice training as a factor in bringing about degrees of implementation. Elements of training have not been explicitly studied in curriculum applications but most of the researchers have concluded that intensive "inservice training (as distinct from single workshops or preservice training) is an important strategy for implementation" (p. 373).

Some of the reports are quite instructive. Downey (1975) reported a low degree of implementation in a well-thought-out and rationalized social studies curriculum in the Province of Alberta, Canada. The inservice work was essentially a "theory-only" treatment in most cases, that is, in short workshops the rationale was discussed and materials were distributed or the provisions of materials, and practice, feedback, and coaching were virtually absent. From the training literature alone we would have predicted that the implementation effort would have failed in much the way Downey found that it did.

On the other hand, in the implementation of the planned variation of Head Start (Lucas and Wohlleb, 1973) fairly high degrees of implementation were evident in many sites where the developers worked directly explaining the rationale, providing materials, demonstrating, providing coaching and moral support.

Similarly, evaluation of the Humanities Curriculum Project in England (Hamingson, 1973; and McDonald and Walker, 1974) compared a sample of schools in which the teachers received training by the sponsors of innovation and in one in which the materials had been brought together but in which there was no direct training. In the first sample, the training provided was fairly substantial and included many elements which we have identified in the training literature. Not only was implementation much greater for the trained group but pupil achievement scores shifted much more in those schools where the teachers had been trained. Thus not only was there greater implementation but the implementation resulted in pupil learning changes in the desired direction.

The curriculum literature also provides support for the notion that the provision of materials and both coaching and psychological support from consultants are important contributors to implementation. Although the evidence is by no means firm, the analysts of the curriculum implementation literature recommend that demonstration lessons be provided, that opportunity to learn skills be included, that coaching for both skill development and psychological support be provided, and also that materials, at least sample units and preferably adequate materials to support the implementation, be provided, explained and demonstrated. The curriculum implementation literature has tended to include either very weak treatments (theory-only or theory-plus-materials-only) and/or a massive inservice effort which, while not explicitly identifying the elements which have emerged from the training literature, appears to include all or most of them. In the former case, little implementation occurs on the part of most teachers, while in the latter case, relatively high degrees of implementation are reported.

The curriculum literature thus adds the provision of resources to the paradigm if one wishes a high degree of implementation to occur and, of course, directs our attention toward the organizational variables and the macro-socio-political variables that are unquestionably important but out of the scope of our specific concern here.

To this the recent National Science Foundation studies add a number of other elements. The provision of subject matter information and how to apply it explicitly to a new curriculum is cited frequently, implying an expansion of the theory component in training systems. The results of those investigations also emphasize the provision of materials, affirm the amounts of relearning necessary if new teaching methods are to be acquired and utilized, and affirm also the need for consultants who can provide coaching during the implementation period.

Thus the overall impression is that there is a relatively high degree of congruence between the curriculum implementation literature and the literature on training as such, with attention to additional factors having to do with the materials and the importance of a favorable macro-social context and organizational climate at the particular school sites.

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# APPENDIX B

# COMMUNICATIONS WITH TEACHERS

Graduate Studies and Administrator Certification 686-5171
Information and Field Services 686-3409
Center for Educational Policy and Management 686-5173

Division of Educational
Policy and Management
College of Education
UNIVERSITY OF OREGON
Eugene, Oregon 97403

November 18, 1981

## Implementation of Training Study (IOTS)

### Project Description

As educators we all are concerned with finding ways to make inservice teacher education pay off, for both teachers and students. This project is investigating ways to improve the delivery of inservice teacher training. The training will focus on learning several models of teaching and applying those models in classroom practice. The yield for all of us should be a better understanding of how training works and how students respond to the various models.

IOTS will be conducted in three phases. In January and February participants will be trained in three Models of Teaching. The training will be designed to provide for each model the theory from which it was developed, multiple demonstrations of the model, opportunities for practice and feedback during the training sessions, and classroom practice. In March and April, project staff will observe teachers as they attempt to use the new models in their classroom teaching and interview teachers regarding any problems they experience as they use the new strategies. In May, each teacher participant will teach a one-week unit (Language Arts/Social Studies) to one class of students. Students will be tested over the content of the unit and teachers will be observed during the teaching of the unit.

### Requirements of Participants

Teachers participating in IOTS will need to agree to the following:

--participation in all three phases of the project from January through May, e.g., in January/February, a group meeting once a week for eight weeks, in March/April, four classroom observations, and in May, teaching the one-week unit to one class of students
--random assignment to several kinds of assistance during the second phase of the project
--completion of a brief paper and pencil attitude test, a teaching log recording use of the trained models, and several interviews

(over)

an equal opportunity/affirmative action institution

## Benefits to Participants

Teachers participating in IOTS will receive three hours of graduate credit (tuition free) from the University of Oregon for participating in the initial training (January/February) and a stipend of $75 for time spent in interviews and meetings during the second phase (March and April). In addition, teachers will have some support and companionship as they attempt the difficult task of implementing new stragegies into their teaching repertoires.

## Reporting of Findings

Results of this study will be reported to the National Institutes of Education and the American Educational Research Association, and may be published in professional journals. The anonymity of all participants is guaranteed; results will be reported in such a way that the identity of any single participant is impossible to determine. In addition, each teacher participating in the project will receive extensive feedback on information gathered in his/her classroom as well as total project findings.

## Informed Consent

Your participation in this project will, I believe, be of mutual benefit to you and me. However, your participation is purely voluntary. If you are willing to participate, please sign the statement below and return to

Beverly Showers
College of Education
University of Oregon
Eugene, OR 97403

or, if you have questions or would like clarification, call me at 686-5521.

---

The purpose of this research has been explained to me and I understand that my participation is voluntary.

Signed______________________________

Date________________________________

UNIVERSITY OF OREGON

April 24, 1982

MEMORANDUM

TO: Project Teachers

FROM: Beverly Showers

RE: Vocabulary Test Results

The V-3 Wide Range Vocabulary Test you administered to your students in late March had a range fo grades 6-13. A perfect score would have been 48, although it is highly unlikely that students at grades 6,7,8 would top out on this test.

Generally speaking, students at grades 6 scored lower than students at grade 7 and so on. The raw scores reported here cannot be translated to grade equivalents but may be of interest to you in terms of individual students' performance on the test.

Continuing Education • Continuation Center • 333 Oregon Hall • Eugene. OR 97403-1217 • Telephone (503) 686-4231
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UNIVERSITY OF OREGON

Dear________________,

On Monday through Thursday, May _____ through May _____, you will be teaching the special unit we discussed in January (and again in March). All students will be administered the same tests at the completion of the unit (a multiple choice recall test on factual information contained in the materials, an essay test about Roussillon, and an attitude test). However, you are free to choose the specific objectives you wish to emphasize. (If your goals are to improve composition skills, use these materials as a basis for writing assignments; if your goals are to develop comprehension skills, use these materials to those ends, etc.)

Attached you will find one booklet on Roussillon and 39 slides. The following slides mentioned in the booklet are not available: 2-4, 11-3, 11-11, 14-1, 20-1, 20-2, 21-3, 34-1, 34-2, 34-4, 57-2, and 61-2.

On Friday, ___(date)______, your students will be tested by one of our staff and you will be interviewed. At that time, we would like to collect your logs (records of use for these models since our class quit meeting) and discuss with you your lesson plans for the unit on Roussillan. Please bring both your logs and your lesson plans to the interview.

Thank you for your help. We genuinely appreciate it.

Sincerely,

Bev Showers

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UNIVERSITY OF OREGON

May 24, 1982

Dear

You are cordially invited to a party at my house on Wednesday, June 2 from 4:00 to 6:00 p.m. (or whenever). We will have some snacks and liquid refreshment, give you your student scores on the recall part of the Roussilion test, relax and visit (see map and directions below). If any of you have logs you forgot to turn in, please bring them at that time.

Last February, you took a Conceptual Level test at our second class meeting. David Hunt, who developed the paragraph completion method of measuring conceptual level, defines CL as the ability to differentiate and integrate information. High CL scores, according to his theory, indicate cognitive flexibility. You may remember the test you took had six stems. One stem, beginning "The way I feel about parents," was deleted, as ome of you wrote about your own parents and others wrote about parents of your students. Your scores on the remaining five stems (possible range 0-3)were:

What I think about rules__________

When I am criticized__________

When someone does not agree with me__________

When I am not sure__________

When I am told what to do__________

I hope to see you on June 2.

Sincerely,

Beverly Showers

SEE MAP DIRECTIONS ON BACK

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# APPENDIX C

## INSTRUMENTS

## TEACHING ANALYSIS GUIDE FOR CONCEPT ATTAINMENT

### PHASE 1: Presentation of Data and Identification of the Concept

| | | | | |
|---|---|---|---|---|
| 1. Did the teacher state the purpose of the game? | Thoroughly | Partially | Missing | Not Needed |
| 2. Did the teacher explain the procedures of the game (how the "yeses" and "noes" function)? | Thoroughly | Partially | Missing | Not Needed |
| 3. Did the initial "yes" clearly contain the essential attributes? | Thoroughly | Partially | Missing | Not Needed |
| 4. If teaching a conjunctive concept, did the teacher begin with a "yes" exemplar? | Thoroughly | Partially | Missing | Not Needed |
| or | | | | |
| If teaching a disjunctive concept, did the teacher begin with a "no" exemplar followed by a "yes"? | Thoroughly | Partially | Missing | Not Needed |
| 5. Did the teacher ask questions that focused students' thinking on the essential attributes? | Thoroughly | Partially | Missing | Not Needed |
| 6. Did the teacher ask the students to compare the "yes" exemplars? | Thoroughly | Partially | Missing | Not Needed |
| 7. Did the teacher ask the students to contrast the attributes of the "yes" exemplars with those of the "no" exemplars? | Thoroughly | Partially | Missing | Not Needed |
| 8. Did the teacher present labeled exemplars? | Thoroughly | Partially | Missing | Not Needed |
| 9. Did the teacher ask the students to generate and test hypotheses about the identity of the concept? | Thoroughly | Partially | Missing | Not Needed |
| 10. Did the teacher ask the students to name the concept? | Thoroughly | Partially | Missing | Not Needed |
| 11. Did the teacher ask the students to state the essential attributes of the concept? | Thoroughly | Partially | Missing | Not Needed |

PHASE 2: Testing Attainment of the Concept

| | | | | |
|---|---|---|---|---|
| 12. After the concept was agreed upon, did the teacher present additional exemplars and ask whether they contained the concept? | Thoroughly | Partially | Missing | Not Needed |
| 13. Did the teacher ask the students to justify their answers? | Thoroughly | Partially | Missing | Not Needed |
| 14. Were the students able to supply their own exemplars to fit the concept? | Thoroughly | Partially | Missing | Not Needed |
| 15. Did the teacher ask the students to justify their exemplars by identifying the essential attributes? | Thoroughly | Partially | Missing | Not Needed |

PHASE 3: Analysis of Thinking Strategies

| | | | | |
|---|---|---|---|---|
| 16. Did the teacher ask the students to describe the thinking processes they used in attaining the concept? | Thoroughly | Partially | Missing | Not Needed |
| 17. Did the teacher ask the students to reflect on the roles of attributes and concepts in their thinking strategies? | Thoroughly | Partially | Missing | Not Needed |
| 18. Did the teacher ask the students to evaluate the effectiveness of their strategies? | Thoroughly | Partially | Missing | Not Needed |

# TEACHING ANALYSIS GUIDE FOR TABA'S INDUCTIVE THINKING MODEL

## I Concept Formation

| | | | | | |
|---|---|---|---|---|---|
| 1. | Did the teacher provide a focus for the lesson? | Thoroughly | Partially | Missing | Not Needed |
| 2. | Did the teacher explain procedures for generating data? | Thoroughly | Partially | Missing | Not Needed |
| 3. | Were sufficient data generated for grouping/categorizing? | Thoroughly | Partially | Missing | Not Needed |
| 4. | Were students instructed to group the data by "what belongs together"? | Thoroughly | Partially | Missing | Not Needed |
| 5. | Did the teacher ask the students to name or label the groups? | Thoroughly | Partially | Missing | Not Needed |

## II Interpretation of Data

| | | | | | |
|---|---|---|---|---|---|
| 1. | Did the teacher ask the students to explain the characteristics of each group or category? | Thoroughly | Partially | Missing | Not Needed |
| 2. | Did the teacher ask the students to explain their data, relating points to each other and attempting to determine cause-effect relationships ("Why" questions)? | Thoroughly | Partially | Missing | Not Needed |
| 3. | Did the teacher ask the students to go beyond the data and make inferences and conclusions regarding their data? | Thoroughly | Partially | Missing | Not Needed |

## III. Application of Principles

| | | | | | |
|---|---|---|---|---|---|
| 1. | Did the teacher ask the students to hypothesize, predict consequences from their data ("what would happen if" or "if. . . , then. . . .)? | Thoroughly | Partially | Missing | Not Needed |
| 2. | Did the teacher ask the students to explain and support their predictions and hypotheses (Why do you think this would happen)? | Thoroughly | Partially | Missing | Not Needed |
| 3. | Did the teacher ask the students to verify their predictions/hypotheses using logic or factual knowledge: | Thoroughly | Partially | Missing | Not Needed |

## TEACHING ANALYSIS GUIDE FOR THE SYNECTICS MODEL

### Phase One: Description

1. Did the teacher elicit ideas from students about the topic? Thoroughly Partially Missing Not Needed

### Phase Two: Direct Analogy

2. Did the teacher define a direct analogy? Thoroughly Partially Missing Not Needed
3. Did the teacher specify the type of analogy, such as non-living or machine? Thoroughly Partially Missing Not Needed
4. Did the teacher elicit analogies? Thoroughly Partially Missing Not Needed
5. Did the category of analogy appropriately contrast the topic? (For example, if the topic was a living thing, such as a shy child, was the category of analogies nonliving things, such as a machine?) Thoroughly Partially Missing Not Needed
6. Did the teacher elicit several analogies? Thoroughly Partially Missing Not Needed
7. If necessary, did the teacher ask students to clarify their suggested analogies? Thoroughly Partially Missing Not Needed
8. Did the students select one analogy to work with? Thoroughly Partially Missing Not Needed
9. Was the analogy familiar to all the students? Thoroughly Partially Missing Not Needed
10. Did the teacher elicit descriptions of the analogy? Thoroughly Partially Missing Not Needed
11. Did the teacher record these descriptions? Thoroughly Partially Missing Not Needed

### Phase Three: Personal Analogy

12. Did the teacher explain a personal analogy? Thoroughly Partially Missing Not Needed
13. Did the teacher ask students to become the "object"? Thoroughly Partially Missing Not Needed
14. Was the teacher able to get the students to state from a personal frame of reference:
    A. how they felt as the "object"? Thoroughly Partially Missing Not Needed

B. how they looked as the "object"? Thoroughly Partially Missing Not Needed

C. how they acted (kinesthetic involvement)? Thoroughly Partially Missing Not Needed

15. Did the teacher record the personal analogy description? Thoroughly Partially Missing Not Needed

Phase Four: Compressed Conflict

16. Did the teacher define compressed conflict? Thoroughly Partially Missing Not Needed

17. Did the teacher summarize the direct and personal analogies or ask the students to summarize them? Thoroughly Partially Missing Not Needed

18. Did the teacher elicit several compressed conflicts based on the materials from the direct and personal analogies? Thoroughly Partially Missing Not Needed

19. Were the students involved in the selection of one compressed conflict that was familiar to all of them? Thoroughly Partially Missing Not Needed

Phase Five: New Direct Analogy

20. Did the teacher elicit several ideas containing the compressed conflict? Thoroughly Partially Missing Not Needed

21. Were the students involved in the selection of one idea that was familiar to everyone? Thoroughly Partially Missing Not Needed

22. Did the teacher elicit discussion of the direct analogy in terms of the compressed conflict? Thoroughly Partially Missing Not Needed

Phase Six: Reexamination of the Original Task

23. Did the teacher have the students describe the original task (idea) in terms of the last direct analogy? Thoroughly Partially Missing Not Needed

24. Did the students' descriptions indicate new dimensions or perceptions of the original task? Thoroughly Partially Missing Not Needed

NAME: ______________________________________

## WIDE RANGE VOCABULARY TEST - V-3

This is a test of your knowledge of word meanings. Look at the sample below. One of the five numbered words has the same meaning or nearly the same meaning as the word above the numbered words. Mark your answer by putting an X through the number in front of the word that you select.

jovial

1-refreshing
2-scare
3-thickset
4-wise
~~5~~-jolly

The answer to the sample item is number 5; therefore, an X has been put through number 5.

You will have 6 minutes for each of the two parts of this test. Each part has one page. When you have finished Part 1, STOP. Please do not go on to Part 2 until you are asked to do so.

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.

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## Part 1 (6 minutes)

1. cottontail
1-squirrel
2-poplar
3-boa
4-marshy plant
5-rabbit

2. marketable
1-partisan
2-jocular
3-marriageable
4-salable
5-essential

3. boggy
1-afraid
2-false
3-marshy
4-dense
5-black

4. gruesomeness
1-blackness
2-falseness
3-vindictiveness
4-drunkenness
5-ghastliness

5. loathing
1-diffidence
2-laziness
3-abhorrence
4-cleverness
5-comfort

6. bantam
1-fowl
2-ridicule
3-cripple
4-vegetable
5-ensign

7. evoke
1-wake up
2-surrender
3-reconnoiter
4-transcend
5-call forth

8. unobtrusive
1-unintelligent
2-epileptic
3-illogical
4-lineal
5-modest

9. terrain
1-ice cream
2-final test
3-tractor
4-area of ground
5-weight

10. capriciousness
1-stubbornness
2-courage
3-whimsicality
4-amazement
5-greediness

11. maelstrom
1-slander
2-whirlpool
3-enmity
4-armor
5-majolica

12. tentative
1-critical
2-conclusive
3-authentic
4-provisional
5-apprehensive

13. placate
1-rehabilitate
2-plagiarize
3-depredate
4-apprise
5-conciliate

14. surcease
1-enlightenment
2-cessation
3-inattention
4-censor
5-substitution

15. apathetic
1-wandering
2-impassive
3-hateful
4-prophetic
5-overflowing

16. paternoster
1-paternalism
2-patricide
3-malediction
4-benediction
5-prayer

17. opalescence
1-opulence
2-senescence
3-bankruptcy
4-iridescence
5-assiduity

18. lush
1-stupid
2-luxurious
3-hazy
4-putrid
5-languishing

19. curtailment
1-expenditure
2-abandonment
3-abridgment
4-improvement
5-forgery

20. perversity
1-adversity
2-perviousness
3-travesty
4-waywardness
5-gentility

21. calumnious
1-complimentary
2-analogous
3-slanderous
4-tempestuous
5-magnanimous

22. illiberality
1-bigotry
2-imbecility
3-illegibility
4-cautery
5-immaturity

23. clabber
1-rejoice
2-gossip
3-curdle
4-crow
5-hobble

24. sedulousness
1-diligence
2-credulousness
3-seduction
4-perilousness
5-frankness

DO NOT TURN THE PAGE UNTIL ASKED TO DO SO.

STOP.

## Part 2 (6 minutes)

25. shortcake

1-condiment
2-pastry
3-fruit
4-sweetmeat
5-vegetable

26. hardtack

1-nail
2-textile
3-weapon
4-wood
5-biscuit

27. commendable

1-pleasurable
2-charitable
3-lucrative
4-proscriptive
5-laudable

28. nonchalant

1-sarcastic
2-discourteous
3-noble
4-unconcerned
5-unsophisticated

29. coloration

1-pigmentation
2-alternation
3-configuration
4-prevention
5-taint

30. aridity

1-bitterness
2-surface
3-sonority
4-dryness
5-torridity

31. demoniacal

1-aloof
2-mythical
3-thoughtful
4-fiendish
5-eccentric

32. highroad

1-mountain road
2-right of way
3-main road
4-roadbed
5-concrete road

33. befog

1-dampen
2-forget
3-whip
4-mystify
5-belittle

34. platoon

1-tableland
2-bridge of boats
3-body of soldiers
4-commonplace remark
5-frigate

35. dullard

1-peon
2-duck
3-braggart
4-thief
5-dunce

36. momentously

1-frivolously
2-moderately
3-weightily
4-momentarily
5-modishly

37. corroboratory

1-plausible
2-anticipatory
3-confirmatory
4-explanatory
5-esoteric

38. figurine

1-metaphor
2-wine
3-poem
4-organ
5-statuette

39. rancorous

1-malignant
2-jubilant
3-abashed
4-inglorious
5-careless

40. inveteracy

1-habitualness
2-migration
3-bravery
4-covering
5-hatefulness

41. choler

1-anger
2-chorister
3-guard
4-saliva
5-refrigerator

42. vacillation

1-purification
2-wavering
3-expulsion
4-tempting
5-foolishness

43. aggrandizement

1-theft
2-impeachment
3-derision
4-amazement
5-enlargement

44. effulgence

1-prominence
2-outline
3-change
4-radiance
5-energy

45. aphasia

1-loss of speec
2-drunkenness
3-anemia
4-loss of memor
5-rash

46. panoplied

1-philosophical
2-dressed in armor
3-panting
4-frenzied
5-atavistic

47. sacrosanct

1-sacrificial
2-dormant
3-inviolable
4-superficial
5-gullible

48. prurience

1-modesty
2-sapience
3-provender
4-lust
5-security

DO NOT GO BACK TO PART 1 AND

DO NOT GO ON TO ANY OTHER TEST UNTIL ASKED TO DO SO.

STOP.

## Initial Interview

Your responses to the following questions will be treated with complete confidentiality.

(1) Would you tell me what you teach in the class we're observing, e.g., what are the major topics or concepts you expect to cover in this class?__________

(2) Has your thinking about what you teach changed during the course of our training?__________. If yes, how?__________

(3) How do you teach this class, e.g., what strategies or activities do you most often use?__________

From what alternatives do you choose when deciding to teach specific subject matter?__________

On what do you base your decisions?__________

(4) Are you using Concept Attainment, Taba, or Synectics strategies to teach this class?__________

How are you using them?______________________________

______________________________

______________________________

______________________________

How appropriate is each of these models for what you teach?____

______________________________

______________________________

Would you predict your continued use of these models?__________

Why or why not?______________________________

______________________________

______________________________

______________________________

Do you think these strategies would be useful for other things you teach?________. What?______________________________

______________________________

______________________________

(5) Were your initial practices with Concept Attainment, Taba and Synectics used to teach new concepts/materials, or to review and check material already taught?______________________________

______________________________

Were your initial practices used in the context of your ongoing curriculum or were they used with unique materials outside your usual curriculum?______________________________

______________________________

______________________________

(6) Have you adapted any of these models to meet the needs of your students?________. How?______________________________

______________________________

______________________________

______________________________

______________________________

## Exit Interview - Inservice Project (Showers

(Collect lesson plans for final unit and all logs from all teachers.)

I. Debrief of teaching of final unit:

1) What were your goals and objectives in teaching this unit? What did you stress with your students?

2) How did you use the Roussillon material?

What, if any, additional materials did you use to teach this unit?

3) What teaching strategies did you choose to accomplish your objectives?

4) Did you consider using any of the models we learned in our training sessions?

_____. If yes, did you use them?_____. How did you use them?

If no, why did you choose not to use them?

5) The materials we provided for this unit of study were extremely unstructured. Did you find that irritating or did it seem to provide opportunities for broader use in terms of your objectives?

II. Debrief of project

1) What did you think this project would be about when we first asked you to participate?

Was it different than you expected it to be?

How useful do you think this project was for you?_________. In what ways?

Think back to your first exposure to each of the models we studied; what did you think of it in the beginning and what do you think of it now?

Concept Attainment ______________________________

______________________________

______________________________

Synectics ______________________________

______________________________

______________________________

Taba ______________________________

______________________________

______________________________

2) How would you estimate your current mastery of each of the models?

Concept Attainment ______________________________

Synectics ______________________________

Taba ______________________________

3) What are you likely to do with these models in the future? ______________________________

______________________________

4) Have you changed your opinion about the usefulness of any of these models from the beginning of our training sessions to now? ______________________________

If yes, how? ______________________________

______________________________

5) Did you feel compelled to practice the models as a result of continuing observations

______________________________

How has practice affected your view of the models we studied? ______________________________

______________________________

Has practice with these models changed how you think about your curriculum? ______

If yes, how? ______________________________

6) How have you adapted these models for use with your students? ______________________________

______________________________

## III. Implementation

1) As you learned new teaching strategies and began to think of how to use them with your students in your subject area(s), what problems did you encounter?

______________________________________________

______________________________________________

______________________________________________

______________________________________________

2) Do you feel there was either support or discouragement in your environment (from peers, administrators, students) for your experimentation with new teaching strategies?

__________Please explain______________________

______________________________________________

______________________________________________

______________________________________________

If you are interested in having feedback on the TIS data collected in your classroom, we will contact you for a conference when the data are analyzed.

For Coaching sample only:

Were the observation/conference sessions (after initial training) useful to you?

________. How or why were they useful to you?________________________

If you found these sessions useful, which parts were most useful for you?________

How would you feel about having this sort of input/feedback regularly?________

How would you feel about providing such input/feedback to a colleague?________

Name

## Student Attitude Form

On this form there are many ideas students might have about a class like the one you were in this week. Please read each one carefully and then pick the answer that shows best how you feel about this week's class.

Then place an "X" in the space that best shows what you think about the statement.

For example:

1. Class was fun this week.

| | | | | |
|---|---|---|---|---|
| Strongly Agree | Agree | Don't Know | Disagree | Strongly Disagree |

If you think that this week's class was really a lot of fun, then put an "X" where it says "Strongly Agree," because you strongly agree with the statement. If you feel that this week's class was no fun at all, then you would put an "X" where it says "Strongly Disagree," because you strongly disagree with the statement. If you think that this week's class was kind of fun, then you would put an "X" in the place for "Agree," and if you think that the class was not too much fun, then you would put an "X" in the place for "Disagree." If you just don't know whether you thought this class was fun or not, you would put an "X" in the middle where it says "Don't Know," because you don't know how you feel about the statement.

2. What I learned about in class this week was not interesting to me.

| | | | | |
|---|---|---|---|---|
| Strongly Agree | Agree | Don't Know | Disagree | Strongly Disagree |

If you think that what you learned this week was really not at all interesting to you, then put an "X" where it says "Strongly Agree," because you strongly agree with the statement. If you feel that what you learned about this week really was interesting to you, then you would put an "X" where it says "Strongly Disagree," because you strongly disagree with the statement. If you feel that what you learned about this week was not interesting, then you would put an "X" in the place for "Agree," and if you think that what you learned was sort of interesting, then you would put an "X" in the place for Disagree." If you just don't know if you thought what you learned this week in class was interesting or not, then you would put an "X" in the middle where is says "Don't Know."

1. I think it is interesting to learn about other towns.

______ Strongly Agree ______ Agree ______ Don't Know ______ Disagree ______ Strongly Disagree

2. I think I did well in class this week.

______ Strongly Agree ______ Agree ______ Don't Know ______ Disagree ______ Strongly Disagree

3. The teacher helped me to feel what it would be like to live in the town I learned about this week.

______ Strongly Agree ______ Agree ______ Don't Know ______ Disagree ______ Strongly Disagree

4. I think the teacher gave too many long speeches.

______ Strongly Agree ______ Agree ______ Don't Know ______ Disagree ______ Strongly Disagree

5. I felt like I didn't have much to say in class this week.

______ Strongly Agree ______ Agree ______ Don't Know ______ Disagree ______ Strongly Disagree

6. I would like to learn more about the town we talked about this week.

______ Strongly Agree ______ Agree ______ Don't Know ______ Disagree ______ Strongly Disagree

7. The topic we learned about this week was more boring than most of those I learn about in school.

______ Strongly Agree ______ Agree ______ Don't Know ______ Disagree ______ Strongly Disagree

8. It seemed like the teacher was really interested in the town we learned about this week.

______ Strongly Agree ______ Agree ______ Don't Know ______ Disagree ______ Strongly Disagree

9. I think it would be exciting to learn more about towns like the one we learned about this week.

______ Strongly Agree ______ Agree ______ Don't Know ______ Disagree ______ Strongly Disagree

10. I think the teacher helped me learn more than I would have learned by just reading about the town we talked about this week.

______ Strongly Agree ______ Agree ______ Don't Know ______ Disagree ______ Strongly Disagree

# DIRECTIONS FOR ESSAY TEST

This week you have learned something about life in a small French village-- Roussillon. On the lined page (or two pages, if you need them), I want you to write a letter to a friend telling him or her what it would be like to live in Roussillon, how it is different from the way we live here, and how you feel about the differences. (Repeat the three things they should consider as they write their letter). You will have 15 minutes to write. You may begin.

Name____________________________

NAME:____________________________
(Please print clearly)

DATE:____________________________

TEACHER:__________________________

On the following pages are some multiple choice questions about what you have learned this week. For each question, circle the number (1, 2, 3, or 4) corresponding to what you think is the right answer.
For example:

Roussillon is located in
1) England
2) Italy
3) France
4) Germany

Make your circle carefully, clearly marking just the one answer that you choose. If you want to change an answer, erase the old one as carefully as possible.

If you really don't know an answer, don't just guess. Leave it blank. But, if you feel fairly certain about what you think is probably the correct answer, then mark that answer. You will have plenty of time, so try to answer as carefully as possible.

STOP--DO NOT TURN THE PAGE

1. The people of Roussillon
    1) used to have a market day by law.
    2) have a market day on Sunday.
    3) go to Apt for market day.
    4) have a law against holding a market day in their town.

2. In Roussillon the houses
    1) have large front yards
    2) have small front yards
    3) have no front yards
    4) have gardens instead of front yards.

3. The job of an ochre miner is
    1) an easy job which pays little money.
    2) a hard job which pays little money.
    3) not an exceptionally hard or easy job.
    4) a hard job which pays a lot of money.

4. Which of the following statements is true about the people who live in Roussillon?
    1) Occupational differences between people are ignored.
    2) People are very aware of occupational differences between people, but such differences have little effect on how people treat one another.
    3) People are very aware of occupational differences between people, and such differences have a large effect on how people treat one another.
    4) Farming is the most respected occupation.

5. Who in Roussillon can actually pay cash for all the things he needs?
    1) Some farmers.
    2) The teacher.
    3) The town clerk.
    4) Some ochre miners.

6. In Roussillon, motor vehicles are
    1) not used much in town.
    2) important for commercial transportation.
    3) unimportant for social reasons.
    4) maintained to look as nice as possible.

7. Buildings in and around Roussillon are
    1) usually built of wood, which is cheaper than other building materials.
    2) built with an extra-thick wall on one side, to keep out the wind.
    3) often built using a wide variety of designs and materials.
    4) stuccoed on the outside with a mixture that is red because of the ecology of the area.

8. Inheritance is
    1) seldom of importance in Roussillon.
    2) specified by law in Roussillon.
    3) the caus of two families owning parts of the same house.
    4) not a cause of many problems about ownership.

9. The salle is
    1) a meal similar to supper.
    2) the main room of a Roussillon home.
    3) a statue and a small park dedicated to the memory of an heroic girl.
    4) a small salt-shaker.

10. The stores in Roussillon
    1) include the Apt, an apartment-like supermarket.
    2) were six in number until after World War II.
    3) are inadequate for fulfilling all the residents' needs.
    4) are the only sources of produce.

11. The farmers of Roussillon have subsistence-farmed in the past. This means that they once
    1) lived solely off the crops they produced.
    2) depended on their farming profits to supply most of their food, clothing and other necessities.
    3) were given the subsistence in exchange for farming the land owned by a person of royalty.
    4) produced a single crop, which determined how much they would earn each season.

12. If a native of Roussillon remains living there, he usually works
    1) doing what his friends do.
    2) doing what his father does.
    3) for the government.
    4) doing what his family tells him to do.

13. Since many people in Roussillon need to spend more money than they make, they
    1) often have several jobs.
    2) often trade rather than use money.
    3) are being taken care of by the government.
    4) are raising the amount they charge for their services.

14. Boules is
    1) a kind of soup dish.
    2) a game similar to our bowling.
    3) the French word for "game"
    4) an undergarment worn by French women.

15. The farmers did not want to plant fruit trees in Roussillon because
    1) the climate was not suitable.
    2) the trees take many years to grow.
    3) people in Roussillon don't eat very much fruit.
    4) the fruit would spoil before it got to market.

16. In Roussillon, a woman who is serieux
    1) keeps her house neat and clean at all times.
    2) only spends time on making her house neat and clean if visitors are coming.
    3) decorates her house with curtains and paintings.
    4) decorates her house according to the latest fashions.

17. Considering the way houses are arranged and furnished in Roussillon, the people there seem to be
    1) rather concerned about their personal comfort.
    2) not too concerned about their personal comfort.
    3) especially concerned about the comfort of young children.
    4) concerned about how their houses look.

18. In Roussillon, the interiors of most houses
    1) are clean simple, and rather basic
    2) are painted in a variety of colors.
    3) are usually cluttered, since the houses are so small.
    4) are usually cleaned once a month.

19. Why were there many empty houses for a long time in Roussillon?
    1) The people who are from Roussillon are very independent, and prefer to live in a house that they have constructed for themselves.
    2) The houses needed repairs, and no one wanted to repair them.
    3) People died or moved away, and more people did not appear to replace them.
    4) The houses were too expensive for local people to buy.

20. The fuel for stoves in Russillon is
    1) electricity.
    2) gas.
    3) coal.
    4) wood

21. A man who grinds wheat is called a
    1) cobbler .
    2) blacksmith.
    3) miller.
    4) grovener.

22. Ochre is a
    1) green vegetable.
    2) red dye used in making paint.
    3) green dye used in making paint.
    4) fertilizer for fruit trees.

23. In Roussillon, most of the people who worked with ochre came from
    1) Algeria.
    2) Roussillon.
    3) Paris.
    4) Avignon.

24. Women in Roussillon do not go the cafe because
    1) They have too much housework to do.
    2) Only men are allowed in the cafe.
    3) They have to stay home with the children.
    4) They don't like to sit around and gossip.

25. The farms near Roussillon are farmed by
    1) large concerns from the cities.
    2) Hired hands.
    3) The farmer, his wife and children.
    4) The cooperatives.

26. The most important meal in Roussillon is
    1) the noon meal.
    2) breakfast.
    3) supper.
    4) gouter.

27. Why are stones put on the roof tiles in Roussillon?
    1) To help direct the flow of rainwater off the roof.
    2) To keep the wind from blowing the tiles away.
    3) People like the way it looks.
    4) They help keep the house cool in summer.

28. The families in Roussillon usually stay in:
    1) the living room because the TV is there.
    2) the kitchen where the mother is.
    3) their bedrooms so they can be alone.
    4) The salle, because it is living room, dining room, and kitchen combined.

29. All the houses in Roussillon are filled because:
    1) the population is constantly increasing.
    2) people from the cities have bought the empty houses.
    3) if a house is empty too long it gets run down.
    4) people like to rent houses in Roussillon.

30. People have their babies baptized in Roussillon because:
    1) they are afraid they will die.
    2) the children may want to get married in the church.
    3) everyone loves baptism.
    4) they don't want the children to go to Hell.

31. To have a baby in Roussillon, the mother
    1) goes to the hospital in Apt.
    2) has the doctor come to the house.
    3) calls her mother to come and help.
    4) goes to the doctor's office.

32. Most of the workers in Roussillon
    1) are farmers who rent their land.
    2) are farmers who own their land.
    3) are miners.
    4) work in small shops.

33. The government of France is disliked by Roussillon because
    1) the government makes laws which make the people feel helpless
    2) it is too far away to understand the people's problems.
    3) it makes people argue with one another.
    4) they have no one to represent them in government.

34. The climate in Roussillon is cooler than the climate of the surrounding area. This is because Roussillon is
    1) located in the hills.
    2) surrounded by trees.
    3) always facing away from the sun.
    4) always windy.

35. People from Roussillon do not like to borrow money because
    1) they do not trust banks.
    2) they feel it is important to be self-sufficient.
    3) they know it would be difficult to pay it back.
    4) they would be criticized for spending more than they need to spend.

Teacher____________________ Coder____________________ Date____________________

No. of Children in Room______ Model__________ Time Start________________ Time Finish________________

**Molar Set**
I___
II___
III___

**Setting**
1. Entire Class___
2. One instr. group within class ___
3. Multiple groups ___
4. Individualized instr___
5. Other

**Curriculum**
1. Reading___
2. Lang. Arts___
3. Soc. Stud.___
4. Multiple___
5. Other___

**Materials**
1. Programmed___
2. Inductive___
3. Open-ended___
4. Multiple___
5. Other___

**Posture**
1. Director___
2. Lecturer___
3. Discusser___
4. Recitator___
5. Tutor___
6. Monitor___
7. Counselor___
8. Participant___
9. Non-inter.___

**Phase**
(if appli.)
1
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C Tea Date Time MS Set Curr Mtls Pos Mod Ph

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**Structuring** **Information** **Feedback**

Goals Content Procede. Imple.

| | 1 Dir | 2 Neg | 3 Dir | 4 Neg | 5 Dir | 6 Neg | 7 Inst | 8 Non | 9 Fact | 9 Fact | 10 Con | 11 Theo | 12 Open | 13 Opin | 14 Pos | 15 Neu | 16 Neg | 17 Corr | 18 Rept | 19 Dig |
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| TQ | | | | | | | | | | | | | | | | | | | | |
| SS | | | | | | | | | | | | | | | | | | | | |
| SQ | | | | | | | | | | | | | | | | | | | | |

# APPENDIX D

## CASE STUDY

Note: The following case study of a coached teacher's response to and performance in the project training is one of a series developed to generate variables for comparison of coached and uncoached teachers. Other case studies will focus on one coached and one uncoached teacher who were unsuccessful in accomplishing transfer of training, and the uncoached teacher who achieved the greatest degree of transfer among the uncoached teachers. Variables generated at this point include initial responses to training, performance in early trials with the models, practice with the new strategies in classroom settings, and the extent to which cognition and skill came together at the close of the project.

## CT

### Case Study

CT teaches language arts in the seventh grade in a junior high school. Her assignment includes five forty-five minute instructional periods with one period set aside for preparation. She is one of the "lead" teachers of the school and is serving on the committee planning for a transition to a middle school type of organization within the district. She is popular with her colleagues and has the confidence of the principal.

### Approach to Teaching

CT's approach to teaching has been heavily influenced by workshops in a "direct instruction" method for approaching reading and the language arts. The workshops were taken under the auspices of the school district and she became very enthusiastic about the approach. She feels confidence about her teaching and in the general methods she has been using. She was curious enough about this training experience to participate in it, but was dubious about its value, especially since the instructional methodologies introduced might be different from the ones normative in her own work. A considerable part of her instruction is materials-based. The materials she uses are modular in nature and cover various aspects of the language arts, such as "study skills", which includes a variety of reading and summarizing skills. It would not be unusual to find her moving from student to student around the classroom, helping individuals who are at work on the booklets which contain the instruction. The self-instructional materials are administered en masse. All students are given the same assignment, the materials are passed out, they work through the materials while she moves around the room providing assistance as it is asked for or as she perceives it is needed. When all of the students have completed the assignment, she usually holds a general discussion over the materials, utilizing a recitation mode for the most part but not entirely.* As indicated earlier she has been using this approach for some time, feels skillful and comfortable with it and believes it is adequate to achieve most of the objectives that she seeks.

### Responsiveness to Training

CT was somewhat dubious about the training provided by this project. She voiced concern about how it would fit into the well established instructional modality she had developed, but voiced her concerns in a matter-of-fact rather than resistant fashion. At first she was rather quiet during the training sessions but she took the materials back to her classroom and began to practice each of the models as they were introduced to her. The more she practiced the more she participated in class. She seemed surprised that an "education course" could offer anything of practical use but was pleased that it did so. By the end of the course she reported that she had really needed more variety in her teaching and had been able to incorporate the new models to provide that variety. Thus she passed through the stages of skepticism both toward the content of the training and toward the course experience as a possibly productive mode to quiet acceptance, exploration, participation and an appreciation that she had developed useful knoweledge and skills. Her attitude toward specific models became more favorable also, e.g., "I was so leery of Taba, now it's my favorite."

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*This is a description of one of the five classes she teaches

Her openess included a willingness to seek help. Despite her early skepticism she reported the difficulty she had during her early trials with the models in the classroom and sought help in discussion over her problems.

## Teaching Style: Before, During and After Training

As indicated earlier, CT's overall approach to teaching was built around highly sequenced instructional materials and she assumed the tutorial role and later the role of recitation leader as the instruction proceeded.

Baseline TIS observations were taken while CT was in the stance of tutor or recitaiton leader (see Table 1). Interestingly, CT exhibited Flanders' classic two/thirds rule for recitation, as did the entire sample (see Table 2). Twenty percent of CT's communications in these baseline lessons was devoted to structuring, 30 percent to information processing, and 15 percent to sanctioning and/or feedback.

As soon as training had reached the point where the teachers had some acquaintance with the theory of the models, had seem them demonstrated and had practiced them in the training settings, the period of initial application in the classroom commenced. The applications included voluntary use and one "on demand" use of each model to provide the opportunity for the investigators to examine their performance.

During this period CT tried each model a number of times, according to her log, at fist, tentatively, and them more confidently. The results of the "on demand" applications reflect CT's attempts to conform to the require-

## TABLE 1

### Mean Frequencies for CT and All Teachers on TIS Categories for Baseline, Skill Level, Treatment and Final Unit Observations

| | TS | TQ | SS | SQ | TTS | TTI | TTF | STS | STI | STF | Fac | Con | Theo |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Baseline CT | 38.04 | 14.57 | 20.43 | 8.48 | 16.52 | 24.13 | 11.96 | 4.57 | 23.69 | .65 | 40.0 | 5.00 | 0.00 |
| All Teachers | 44.50 | 16.21 | 19.62 | 10.63 | 22.99 | 26.91 | 10.80 | 9.03 | 20.07 | 1.14 | 40.45 | 5.77 | .11 |
| Skill Level CT | 24.47 | 24.34 | 37.37 | 1.18 | 9.48 | 32.63 | 6.71 | 1.71 | 36.45 | .39 | 23.0 | 43.0 | 1.00 |
| All Teachers | 35.00 | 25.62 | 32.08 | 4.58 | 14.53 | 33.71 | 12.37 | 3.44 | 31.36 | 1.86 | 24.31 | 33.40 | 6.59 |
| Treatment CT | 22.56 | 15.00 | 25.47 | 1.74 | 7.91 | 22.67 | 6.98 | 1.40 | 25.35 | .47 | 30.0 | 12.00 | 1.00 |
| All Teachers | 32.63 | 13.66 | 24.03 | 3.41 | 11.77 | 24.14 | 10.38 | 3.15 | 22.86 | 1.43 | 34.50 | 8.21 | .97 |
| Final Unit CT | 40.16 | 21.80 | 42.62 | 4.26 | 22.29 | 32.14 | 7.54 | 3.77 | 41.15 | 1.97 | 41.00 | 22.00 | 5.00 |
| All Teachers | 35.15 | 14.67 | 30.75 | 3.43 | 13.50 | 27.35 | 9.16 | 3.50 | 27.36 | 3.33 | 37.64 | 9.67 | 2.92 |

**Key**

TS - Teacher statement (all 19 categories)
TQ - Teacher questions (all 19 categories)
SS - Student statements (all 19 categories)
SQ - Student questions (all 19 categories)
TTS - Teacher tells - structuring
TTI - Teacher talk - information processing
TTF - Teacher talk - feedback

STS - student talk - structuring
STI - student talk - information processing
STF - student talk - feedback
Fac - teacher and student talk - factual information processing
Con - teacher and student talk - conceptual information processing
Theo- teacher and student talk - theoretical information processing

*CT was one of the "coached" teachers.

Table 2

Percentage of Teacher Talk and Student Talk for CT and All Teachers For Four Observation Periods

| | Teacher Talk | Student Talk |
|---|---|---|
| Baseline | | |
| CT | 65 | 35 |
| All teachers | 67 | 33 |
| Skill Level | | |
| CT | 56 | 44 |
| All teachers | 63 | 38 |
| Treatment | | |
| CT | 58 | 42 |
| All teachers | 63 | 37 |
| Final Unit | | |
| CT | 57 | 43 |
| All teachers | 59 | 40 |

ments of the new models. Her structuring behavior dropped to 11%, information processing increased to 37% and feedback dropped to 8% of total classroom communications. Teacher talk for the periods in which new models were practiced dropped to 56%, with student talk rising to 44% (42% of which was in information processing). Information processing moved from primarily factual level communications at baseline to a heavier emphasis on conceptual level communications during skill training with the new models of teaching.

At the end of initial training, CT was beginning to use the Concept Attainment strategy to teach language arts content she would normally have taught. She was practicing Taba's inductive strategy with her students but still using content developed by others in the training session (e.g., energy and lifestyle, animals and climate), and she was introducing her students to the several types of analogies employed by the Synectics model, although not yet using the entire model with her students.

The Coaching Period

CT's openess about the problems she was having as she struggled to attain confidence and to transfer the models into the classroom made it relatively easy to elicit rich protocols about her needs and to offer advice.

Although she was cooperative CT had considerable difficulty talking about her teaching in precise enough terms to facilitate coaching. She spoke of objectives in global rather than specific terms (which is interesting, given the kind of curriculum she was accustomed to administering). She tended to use the general categories of objectives appropriated in her training. Asked the objective of a given teaching episode she would say, "study skills," or "comprehension," rather than particular study skills or particular aspects of comprehension.

She was willing from the beginning both to generate new content to teach in order to try these teaching strategies, and also to find ways within her accustomed curriculum to apply them. However, her inability to frame relatively specific objectives hampered her application in obvious ways, since each of the models is directed toward achieving particular kinds of objectives. Much coaching was needed to help her think about instruction in frameworks of objectives to which the models could be applied.

CT enjoyed discussing the use of the models and sought ideas and opinions from others. However, she was not simply seeking advice and the opportunity to give it. In many senses she was seeking confirmation of the reality she was observing. Children were responding in certain kinds of ways she had not experienced before, and she wondered whether the same kinds of responses were appearing in other situations. The need for confirmation of reality became an important theme of the coaching process. As she became more confident with the models, the content of the coaching process turned once again toward the technical. She became interested in improving her technique and had become able to stand back and look at specific aspects of particular models and closely analyze the performance in an effort to improve it. She apparently had progressed from early concerns with "doing" the model and watching the children respond and a period of apprehensions that they wouldn't respond to a concern with the application of the model, that is, the selection of content and learning objectives appropriate to the model. Having become comfortable with the integration of the model into her flow of teaching, she was able to return to the problem of skill, but this time at a much higher level.

Approximately midway through the coaching treatment, the burden of initiation of communications gradually shifted from the coach/investigator to the trainee. CT was anxious to recount experiences she had had when the investigator was not present, solicit advice from descriptions of events that occured, and in general was taking charge of her own education, using the coach rather than being dependent on the coach for her initiation of many of the items of content or for building comfortable space within which she could communicate. Thus, the control of instruction became increasingly student centered.

## The Transfer Task

After the completion of the coaching treatment, all teachers taught the same unit to their students from materials we supplied. Although all project teachers in January agreed to teach this unit as a condition of their participation in the project, attitudes toward teaching it in May covered the whole spectrum of possible approaches to the task ("this is a terrible interruption at this time of the year" to "this will be a wonderful change of pace for both me and the kids").

CT approached the transfer task calmly and confidently. She spent no time criticizing the content, organization or reading level of the materials but immediately analyzed the materials to meet her own objectives in the areas of reading comprehension and what she labeled "critical thinking skills" (e.g., student ability to explore cause/effect relationships and integrate disparate lists of information). She used Taba's Inductive Thinking model to accomplish her objectives.

During the teaching of the unit in CT's class, teacher talk averaged 57% of all communication and student talk averaged 43%, compared to 59% for all other teachers and 40% for all other students. Time spent in information processing by CT and her students, however, was considerably greater than the means for the entire group. CT and her students averaged 41 factual communications, 22 conceptual and five theoretical during lessons on the transfer task, while means for the group were 37.64, 9.67, and 2.92 respectively (Table 1)

(Insert student achievement data here)

## Summary

CT's initial approach to training was midway between open and closed. Although she was somewhat dubious about teaching strategies she feared might be "wishy-washy, free-to-be" she chose to participate in the training and decide for herself if the new strategies would be useful. She agreed to practice the new models, both in the training session and in her classroom, and provided frequent and honest feedback to project staff regarding her difficulties in using the models and her estimates of their usefulness.

In the coaching sessions she moved from a relatively passive stance toward application to enthusiastic and spontaneous, unsolicited use. By the end of the coaching period, she had shared her enthusiasm for the training process and the teaching strategies with other teachers in her building, her principal, and the administrators responsible for middle school planning in the district.

CT's transfer of training scores were in the top quarter of teachers participating in the project. She developed superior skill in two of the three models taught, and was realistic about her need for further practice and application with the third. A major contribution to her high transfer score was her superbly rationalized choice of Taba to develop instruction for the final unit. Her exit interview revealed progression from unspecified objectives to a more formal way of looking at her curriculum and appropriate choices of teaching strategies to match instructional objectives. This ability to make appropriate choices and implement them skillfully is the major objective of our training.